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Hon. K. J. Holyoake,
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This Month's Cover

This month's cover, which has been reproduced from an Ektachrome (Kodak (N.Z.) Ltd.) colour photograph by T. Lloyd, shows a hay baler at work on a farm at Moa Flat, west Otago. The ranges of Central Otago toward Roxburgh are in the background. The latest available figures give a total of 4263 hay balers and pressers for New Zealand, and it is probable that considerably more than 3000 of these are pick-up balers. Pick-up balers, particularly when used with bale loaders, have lightened the work of harvesting in recent years and have enabled farmers to conserve more grass and lucerne as hay.

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Sixty Years' Service to Farming

WHEN one considers the variety of activities of the Department of Agriculture and the efficiency with which it operates in all sections of our most important industry, farming, it is difficult to realise that the building of this service has been the work of only 60 years.

The Department was formed shortly after the successful shipping of refrigerated primary produce from New Zealand to Britain had pointed to far wider markets and tremendous expansion in agriculture had begun. Developing in step with the needs of the industry it serves, the Department may claim some share of the tributes so frequently paid to New Zealand's agriculture. The increasing tempo of scientific farming today and New Zealand's growing importance in the sphere of international food and commodity supplies entail regular assumption by the Department of new responsibilities and obligations.

A brief history of the establishment and development of the Department during its first 40 years or so is given in an article elsewhere in this issue. To the older generation of farmers who read it, it will no doubt recall many incidents and personalities, recorded and unrecorded, that are part of what most will acknowledge is a generally splendid record of service to the man on the land.

Just as the Department's service to farmers by its pioneer officers evolved through the era of horseback tours of backblock districts, then by bicycle and early model cars of uncertain performance, to the various and rapid means of communication of today, so have the complexities of the work and its administration increased.

Economics of Land Use

The Department came into being when farming frontiers were still being pushed into the wilderness and success or failure depended largely on the physical capacity of the individual. During the past 20 years or so, since the end of the era of the opening up and development of the country, increasing importance has been attached to the best utilisation of that fairly static area of land already occupied. Emphasis has steadily been swinging toward the economics of land use, and it is in this sphere that the work of the Department is today particularly important.

During the time I have been Minister of Agriculture and Marketing I have, of course, been closely associated with the work of the Department of Agriculture and with all the producer organisations, statutory bodies, and commercial interests that serve and administer our farming industry. I have a new appreciation of the scope of the work of the Department and have been particularly pleased to observe the generally harmonious and efficient operation of the Department as a State organisation in association with the other bodies on which its activities impinge.

Increasing Production

I referred earlier to international food supplies and the increasing importance of New Zealand's exportable surpluses of primary products. Growing world populations and political unrest as a result of shortages of many necessities of life in overseas countries have placed a great obligation on us in New Zealand to produce to the utmost those things for which our endowment of land and climate most fit us to grow.

By research and experiment and an efficient extension service the Department of Agriculture is bringing to farmers today a far more comprehensive range of information than could ever have been dreamed of by farmers or departmental officers of an earlier generation.

Increasing costs of farming represented by greater capital outlay in purchase and development, shortages and high prices of labour, greater overhead in mechanisation, the need for more and higher-priced fertilisers, etc., have necessitated the supply to the farmer of information and advice that is basically economic. If the farmer individually and the country as a whole are to continue to expand production, the land must be used intensively to the very best advantage.

Advice must be based on wide and certain knowledge of soil types, climate, management, costs, returns, and a host of questions pertinent to the end desired.

Accumulation of Knowledge

On research stations and experimental farms of the Department work vital to the efficiency of New Zealand farming is being carried on. Overseas developments in agricultural science are closely watched and if they promise to be applicable to our own farming, they are tested and adopted, adapted, or rejected according to the evidence of their being economically advantageous. Farmers individually through local instructors and collectively through their industry organisations are constantly bringing problems to the Department for solution, and a great deal of knowledge of land use and stock management throughout the country has been accumulated and is steadily being added to.

The history of a department over 60 years will almost inevitably be highlighted at various times by the work of outstanding personalities. Not the least important contribution made by some of the men who have been prominent in the Department in the past is their establishment of a sound tradition of service that is both an encouragement and a spur to their successors. I am confident that the Department's devotion to the requirements of the primary producing industries will continue at a high level.

It is a pleasure for me as its Minister to congratulate the Department on the achievements of its past 60 years and to offer my best wishes for its future.

K. J. HOLYOAKE, Minister of Agriculture

The Department of Agriculture

By P. R. STEPHENS, Investigating Officer, Department of Agriculture, Wellington

IT is 60 years since the Department of Agriculture was established and it will be of interest to trace the record of its growth, sum up its achievements, and not least to say something about the men who helped to create it and began the pioneer work into the fields of pasture research, animal health, and soil chemistry, as well as those who established the high standards of quality which have built up the reputation of New Zealand produce overseas. But there are others whose names cannot always be recorded—the far-sighted men who have put new ideas into practice on their own farms, showed how they stood the test of experience, and were then able to convince their more sceptical neighbours. Agricultural research and extension workers co-operating closely with progressive farmers have contributed much to the development of the country over the past 50 years or so and doubtless will contribute much in the future.

THIS article will deal mainly with a few of the men in the Department's service who have played a notable part, both in extending its influence among the farming community and pioneering scientific research work into the problems faced by New Zealand farmers.

The early 1890's form a notable period in New Zealand's social and political history and the establishment of the Department was only part of a larger plan to improve the welfare both of the farmer and the people generally. Within a comparatively short space of time legislation for promoting closer settlement and the setting up of a system of advances to settlers, industrial conciliation and arbitration, and old age pensions was brought into force, and in some of these measures New Zealand was in advance of the rest of the world.

Looked back on today these reforms do not seem quite so epoch making, but at the time the interest they created was very real. The programme for closer settlement and the establishment of the Department were very closely linked, for only with advice and assistance could the small settler survive. The amount of help given him may seem niggardly by today's standards, but it was a great step forward for him to receive any assistance, for in earlier years the Government displayed no interest in his success or failure. Closer settlement was indeed the most controversial topic of the time, for though the need for it was everywhere admitted, the manner and the speed with which it should be carried out were keenly debated. The economic depression through which New Zealand passed during the 1880's and 1890's added fuel to the controversy, for it was held by many that there could be no improvement until more people were settled on the land; as against this a time of falling prices and frequent bankruptcies was not particularly favourable for the beginning of such a programme.

Gloomy Period

In many ways the 1880's and early 1890's form one of the gloomiest periods in New Zealand history, for despite the promising future opened up by the invention of refrigeration, immigration had come to an end, public works were scaled down, unemployment was widespread, and the optimism of earlier years had largely evaporated. Farmers had their own special difficulties, because besides the fall in overseas prices, the distance from the markets, the unsatisfactory shipping services, the invasion of rabbits, and the appalling state of the roads in many country districts, they were beginning to be troubled by various insect pests and blights, animal diseases were making severe inroads into their stock, and soil fertility in parts of the country was beginning to decline.

Practical experience, though it counted for much, was not sufficient, and so the demand became stronger for the Government to give some help, not only by making land available to the landless, but by advice and assistance to those who needed it. William Pember Reeves described what would happen to a farmer's query if it were sent to the Government before 1892:—

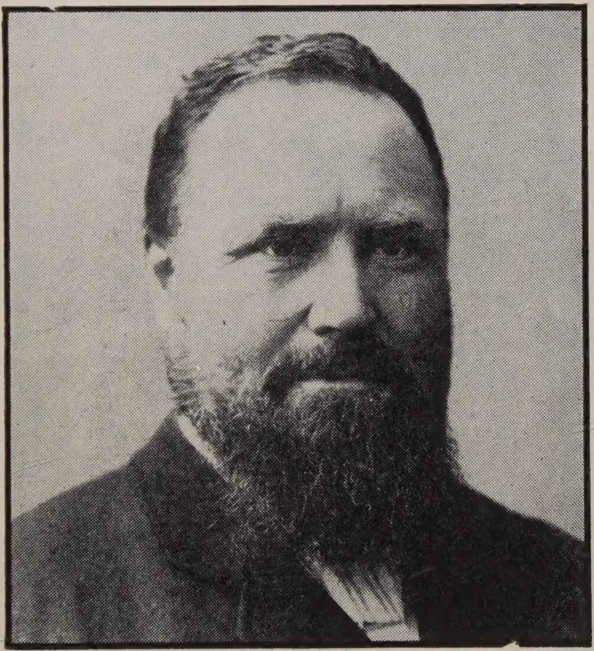
> As for scientific instruction, it used to be said in New Zealand that, prior to 1890, if any one asked the Government for information on a matter calling for agricultural science, his inquiry was regularly sent forward to the colonial geologist. If the question had to do with insects the geologist took counsel of a certain telegraph clerk. If the clerk was puzzled, the twain would seek the advice of the registrar of the New Zealand University.

But something had been done in this direction in 1885 with the passing of the State Forests Act. An awareness of the need for forest conservation was growing and the Lands Department was expanded to include a forestry section, placed under the charge of Thomas William Kirk; at the the same time an agricultural section was established consisting of one man, whose duties were rather vague but were to be concerned largely with the needs of the dairy industry. This gentleman, a Mr. Walter Reeves (no relation of William Pember Reeves), died within 2 years and was not replaced, but the idea of having a man to help and advise the dairy industry was not abandoned.

John Sawers

As early as 1881 a bonus of £500 had been offered for the first shipment of 50 tons of factory-made butter or cheese to an overseas market, and a Christchurch merchant, William Bowron, had been temporarily engaged to make a report on the dairy industry; in 1887 another but less optimistic report was made by Roderick McCallum, but beyond that the Government did not go. Though the Agent-General had been instructed to locate a suitable man for the position of dairy instructor, the first man appointed in 1889, John Sawers, had been in New Zealand for several years.

Sawers was born in Wigtownshire, Scotland, in 1866 and after he had completed his education he turned to dairy farming. He managed a number of dairies, received a season's instruction from a Canadian expert, and in 1885 was appointed manager of the Waiareka dairy factory, near Oamaru. He also leased the Flemington factory near Ashburton (owned at one stage by John Grigg). In 1889 he was appointed Dairy Instructor and appears to have spent much of his time in the South Island. He must have set about his work with energy and determination and most important gained the confidence of farmers and factory managers. He must also have shown how valuable the work was, for during 1891, after the new Government had come into office, a number of suggestions were made in Parliament that a Department of Agriculture should be set up without delay.



[*From Alexander Turnbull Library Photographic Collection.*

Sir John McKenzie, who as Minister of Agriculture from 1892 to 1900 contributed much to the success of the new Department through his enthusiasm, energy, and practical knowledge.

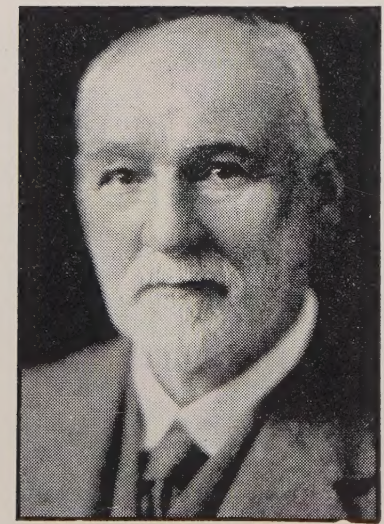
John McKenzie, the new Minister of Lands, replied continually that inquiries were being made, both in New Zealand and overseas, as to the best form of organisation and when he had studied the information available a decision would be made. It was not by any means an easy matter to decide, for there were not very many examples in other countries which could give a lead. In Victoria something had been done, a number of American states had set up advisory services, perhaps more had been done in Germany, France, and Austria, and in 1889, the Board of Agriculture had been set up in Britain. The totally different conditions in these older countries made them rather unsuitable as models and a balance had to be struck between what was necessary and the resources, human and financial, that were available.

Wisely it had been decided that the infant dairy industry needed most encouragement, especially as a beginning had already been made. By 1892 two more dairy instructors, including Carl Sorensen, a Danish expert on buttermaking, had joined Sawers.

Formation of Department

On 30 March of that year the appointment of a Secretary for Agriculture was gazetted and the Department of Agriculture formed by the amalgamation of the Agricultural Section of the Lands Department (consisting of the three dairy instructors plus a nurseryman at Waerenga) with the older Stock Department. This latter organisation had a somewhat uneven history up to that time and was frequently the target for public criticism.

Formed after the abolition of the provinces by the amalgamation of the provincial stock inspectorates, the Stock Department had as its first task the stamping out of sheep scab and then had to deal with rabbits. Though successful in the first, it had not made much headway with the second, but after 60 years one can have more sympathy with the harassed inspectors than had their contemporaries. The task of ridding the country of rabbits was more difficult than their critics realised.



[*S. P. Andrew Ltd. photo.*

John Douglas Ritchie, the first Secretary for Agriculture. He held the post from 1892 to 1909; after that he was for some years chairman of the Land Purchase Board.

John McKenzie before he took over the Stock Department had been as vigorous as any in denouncing any slackness in administration and when he took over he made a number of changes. It was often alleged that inspectors were not always appointed for their efficiency, but such charges were usually exaggerated. Men with plenty of experience in sheep management could readily be found and William Gilbert Rees, for some years in charge of the South Canterbury district, had been the first man to take up a run on Lake Wakatipu.

John Douglas Ritchie

However, one of McKenzie's first moves was to appoint a new head, John Douglas Ritchie, in May 1891. This move caused a good deal of controversy at the time, as Ritchie was completely unknown to the public, though not to McKenzie, and had had no experience in Government administration, which caused many doubts about his ability to fill the new post. But he set about his duties with energy and the following year was made Secretary for Agriculture.

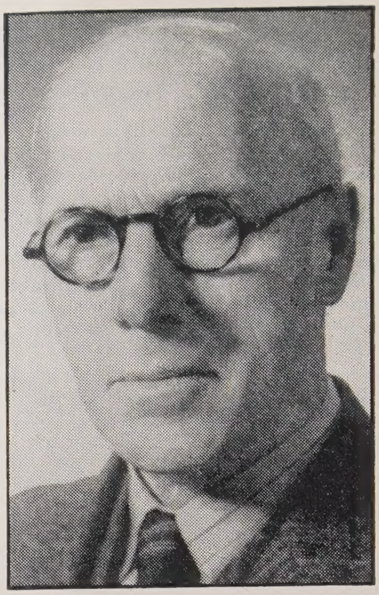
Ritchie was born in Perthshire, Scotland, in 1853, was brought up on a farm, and came to New Zealand in 1877 after he had had some experience with a mercantile firm. His uncle, John Douglas, had come out to New Zealand some years earlier to buy properties for the New Zealand and Australian Land Company and had himself acquired an interest in a few places, including the Mt. Royal run near Palmerston in Otago. Ritchie must have soon been appointed manager of this place and in 1888 he was in Wellington giving evidence before a Parliamentary Committee about the methods used to destroy rabbits. At that time Mt. Royal was carrying nearly 30,000 sheep. John McKenzie's farm was only a few miles away and they probably knew each other fairly well long before 1891.

Grading of Butter and Cheese

Ritchie's reports have rather an impersonal quality, unlike those of his two lieutenants, Clifton and Gilruth, and it is not easy to identify him with any particular measure or even idea. Probably his most important work, besides building up the Department's organisation, was the introduction of compulsory grading of butter for export in 1894 and of cheese in 1898. Both McKenzie and Ritchie realised even more clearly than their predecessors that the expansion of dairy farming was essential if closer settlement was to succeed, and from the beginning their attention was directed toward means by which the standard of New Zealand produce could be raised.

In his report for 1893 Ritchie remarked:—

> . . . It is now recognised by many in the trade well qualified to express an opinion that if New Zealand is to derive the utmost benefit from dairying only the very best butter and cheese should be shipped; the way to ensure this is by a system of grading.



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Winnard Milton Singleton. Trained in Canada, he devoted over 40 years to building up the standard of New Zealand dairy produce. He was appointed Instructor in Cheesemaking in 1901 and became Director of the Dairy Division in 1921, retiring in 1944.

The year before Sawers in his report had expressed doubts as to the practicability of grading, but had insisted that the introduction of compulsory branding was imperative. The Act of 1892 provided for the compulsory branding of produce and the inspection of dairy factories and the 1894 Act for a grading system.

Insufficient Attention to Cleanliness

But compulsory grading could deal with the produce only when it arrived at the point of shipment; the quality before that still depended upon farmers and factory managers, and by no means all of them were aware of the need for absolute cleanliness at every stage of the business. The pioneer dairy farmers who cleared the bush had very little to come and go on. Their cows at least gave them the prospect of a regular income, but it was a meagre one and it took time before they could acquire anything but bare necessities. Their cows were often poor, their sheds and equipment primitive, feed was short in winter, and sheds and yards little more than quagmires. Some of the early factories suffered from the same defects.

Sawers in his report for 1894 wrote:—

> I regret at the same time to state that a number of dairy factory proprietors and managers do not seem to realise the necessity of keeping the factory and creamery buildings and utensils and surroundings as clean and tidy as the manufacture of first-class dairy produce demands. In this respect several factories and creameries are a thorough disgrace to the proprietors and managers. . . . I am in a position to say that, for the most part, the filthy state of these factories and creameries is a result of pure indolence.

During the 1890's the main task of the dairy instructors must have been to spread the gospel of cleanliness. Some of the men who were in charge of this work were Canadians—Kinsella and Ruddick, who was Dairy Commissioner from 1898 to 1901. In 1900 Ruddick on his return to Canada was asked to select a suitable man to be an instructor in cheesemaking. He chose W. M. Singleton, who in 1901 began an association of over 40 years with the New Zealand dairy industry.

It must have been recognised by many people that with the successful introduction of dairy produce grading it would be equally desirable to establish a system of meat grading. Ritchie in his report for 1895 wrote:—

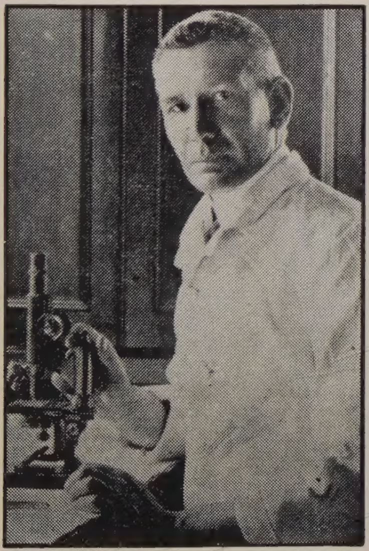
> . . . A system of grading and inspection by properly qualified graders, would in my opinion, put our meat trade on a secure footing. . . . I am strongly of opinion that a general Abattoirs Act should be passed, providing for a Government official inspection, and to be worked in conjunction with the official grading which I have already mentioned.

The following year Ritchie emphasised the need once again, but there was strong opposition to any Government interference in the meat trade.

John Alexander Gilruth

The introduction of meat inspection and indeed the realisation by the public that elementary standards of hygiene should be observed in places where food is handled are largely due to the work of Dr. John Alexander Gilruth, the first veterinarian on the Department's staff.

Gilruth came to New Zealand in 1893 and left it in 1908 to take up the position of Professor of Veterinary Pathology at Melbourne University. His period of service with the Department was not much less than Ritchie's and he impressed his personality more forcibly upon those with whom he came in contact. Not only was he a careful investigator and a true scientist, but he had a pungent pen and the vigour of his reports must have done much to awaken public opinion. His description of the Invercargill slaughter yards in the annual report for 1898 shows just what things were like:—



John Alexander Gilruth. Though he left New Zealand in 1908, he made his mark by the establishment of the Department's veterinary services and by bringing home to farmers the importance of animal health.

> . . . On the whole, the conditions under which meat is dressed prior to being exposed for sale in Invercargill are about as deplorable as could well be imagined, while, of course, the public have not the guarantee, which can only be given by official inspection, that their meat supply is fit for human consumption. . . .

Later in the same report Gilruth after describing conditions at the slaughter yards at Invercargill and Dunedin said:—

> I venture to state that in no other civilised portion of the world could a similar state of things be found in such an important industry from the public health point of view. . . .

Gilruth was the real pioneer into the scientific investigation of animal diseases in New Zealand, and from 1893 until 1905 a great deal of field work was carried out by him and his staff, Reakes and Reid in particular. Many contagious and nutritional diseases were given attention and much information was passed on to farmers. Even where no satisfactory results were obtained the careful documentation made was of great value to later research workers.

All this work was done without a proper laboratory, the first makeshift one being a shed in the grounds of the Government Buildings, and here Gilruth made himself objectionable to the staffs of various Government departments by leaving sheep carcasses to rot over the weekends. This was all part of a scheme to obtain a proper laboratory, but the immediate result was that he was pushed further away into a shed at the back of the old Parliament Buildings. Eventually a small block of land was obtained at Wallaceville and in 1905 a small laboratory was completed.

Not only was Gilruth the author of vigorous reports, but the speeches he made before farmers' gatherings were equally forceful. For example at such a meeting in 1903 he said after dealing with some of the common stock diseases:—

> You will have observed that in the main I have invoked the stock owner to help himself, feeling that therein lies his safety rather than in the exercise of plenary power by the inspectors. True, in such instances as strangles and tuberculosis I am of opinion that the assistance of some compulsion is desirable, yet even in these diseases I have much more faith in the common sense of the farmer than in the dubious logic of the law. Educated regarding the possible gravity of the situation, I believe that the farmer would do all that is necessary without compulsion. But, absolutely in the matter of the other diseases I have mentioned, the power of preventing further trouble to yourselves and the generations succeeding you rests with you, and no scheme of compulsion can ever aid you if you are not desirous of helping yourselves.

In 1912 Gilruth was appointed Federal Administrator of the Northern Territory at a time when Australians were taking a greater interest in the north, but the economic development of the north proved a more intractable problem than had been realised, and the war diverted energies elsewhere. Gilruth made strenuous efforts to overcome the main difficulties encountered, but when he left in 1919 little real progress had been made.

Thomas William Kirk

Insect pests, blights, and so on were a frequent cause of complaint when the Department was founded and the appointment in 1893 of Thomas William Kirk, a son of Professor Kirk, who had for 3 years been in charge of State forests, was intended to provide some help. His first task was to write up the life history of insect and fungous pests and to prepare a number of leaflets on noxious weeds.

[*S. P. Andrew Ltd. photo.*

Thomas William Kirk, appointed biologist of the Department in 1893, began the systematic study of plant diseases in New Zealand.

Before joining the Department Kirk had been a member of the Colonial Geologist's staff, so that it may have been to him rather than to Sir James Hector that queries on agricultural matters were addressed. Kirk took over this work when the sum total of knowledge on the subject was little more than a collection of "amateur generalities". Pressure of routine work and later administrative duties prevented him from undertaking any long-term research, but he at least began the work which was to be continued so successfully by the younger Cockayne.

In 1896 Kirk laid down a grass garden at the Moumahaki Experimental Farm, but there is no record of any investigation being undertaken as a result. Some years later, the garden having deteriorated so, it was dug up and replanted. In 1908 Kirk relinquished the position of biologist to take over control of the Orchards, Gardens, and Apiaries Division, which in 1915 became the Horticulture Division. He retired in 1920 and died in 1936. His brother was for many years Professor of Biology at Victoria College.

After the Department was established means had to be provided for some research work to be undertaken, and this was met by setting up experimental farms in various parts of the country. Only experimental work of a fairly simple character could be undertaken at first, for the main purpose of these farms was to demonstrate the value of improved farm-management practices. The first was established at Moumahaki, near Waverley, in 1893 and others were established at Waerenga (the Lands Department had a wattle plantation there), Ruakura, Weraroa (near Levin), Tauranga, and Arataki (near Havelock North). These farms did a great deal of useful work and though their limitations became

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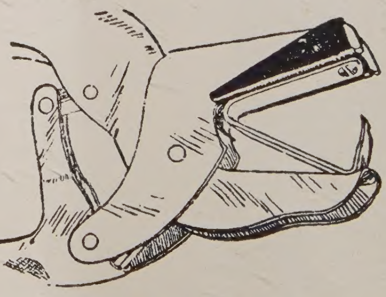

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apparent in later years, they paved the way for the more intensive experimental work.

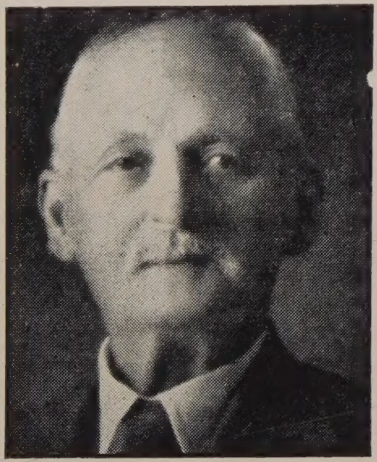
Edmund Clifton

In 1908 the Department was reorganised and a special division (Fields and Experimental Farms) was created. This new division was placed in the charge of Edmund Clifton, at that time in charge of the Department's activities in the Auckland district, where he had much to do with the farms at Waerenga and Ruakura.

Clifton had a notable influence on New Zealand farming, for he played an important part in convincing farmers generally of the importance of careful pasture management and he supervised the first topdressing trials at Ruakura from 1904 to 1907.

Clifton was born in 1849 and came to New Zealand in 1872; from then until 1884 he was employed in the Castlepoint district, where he managed at times Aohanga and Castlepoint Stations. He must have been fairly familiar with Akitio too, and as the Department has been making a close investigation of this district in the last year or so, some comments from Clifton would no doubt have proved very helpful, as he would have known the country little more than 20 years after the first pastoral occupation. Clifton must have been a good man with stock, for scab was very widespread in the Castlepoint district about 1880, but the stations he had managed were clear of it.

In 1884 Clifton joined the Stock Department and was stationed in the Amuri district and later at Kaikoura, and there he was responsible for cleaning up scab on the Clarence River runs. As a reward he was placed in charge of the Otago-Southland area, but was soon transferred to Auckland, where he remained from 1889 to 1907. Apart from his regular duties Clifton's most notable work was to draw attention to the problem of pasture deterioration on much of the hillier land which had been cleared of bush and where pastures had been very good for a year or so. About 50 years ago it was becoming clear that permanent pastures of ryegrass, cocksfoot, and white clover could not be maintained on much of the bush land, and periodic ploughing was not profitable.



[*Alan Blakey photo.*

Edmund Clifton, who was associated with New Zealand farming for 60 years. An early advocate of careful pasture management, he lived to see his ideas bear fruit.

Clifton at that time advocated the sowing down of pastures with low-fertility-demanding grasses and he welcomed the invasion of danthonia when writing in the annual report for 1901:—

> Nature herself is effecting a beneficient transformation over the face of the country with the assistance of her own natural allies—the indigenous grasses of New Zealand. From North Cape to East Cape, along the West Coast and through the Waikato these grasses—danthonia (several varieties), microlena, and Chewings fescue (this last may be almost admitted as a New Zealand grass)—are everywhere increasing. These native grasses have taken advantage of the careful preparation made by our settlers for the reception of exotic grasses—rye [ryegrass], cocksfoot, clovers, etc. These natives unostentatiously and by the settler unwelcomed, replaced those earlier, costly, and but fleeting guests designated under the generic name of English grasses.

Clifton's elegant but somewhat ornate style by today's standards may have been due to his being educated in France.

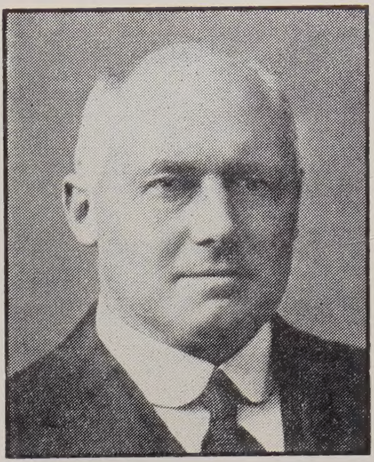
Early Topdressing Trial

The topdressing trial at Ruakura convinced Clifton that worthwhile improvements in pastures could be attained this way, and in the 1905 report he wrote:—

> One of the most, if not the most, disappointing aspects of agriculture in this district is the absence of profitable permanent pasturage, except on lands that are of the most fertile description of volcanic soil. At Ruakura there is no old pasture of any stock-carrying capacity; there certainly are some areas in old grass, these grasses consisting chiefly of sweet vernal, fog, some trefoil, and a little cocksfoot and florin. One of these old pastures, in 1904, was stocked heavily, hay carted on to it and fed off, 2cwt. of basic slag applied, the whole well harrowed, and now other grasses and white clover are appearing: it is a marked contrast to the portion left untreated. This would lead up to the idea that, in place of the usual routine here—roots, grain, grass, or vice versa, then after a few years in grass, the process repeated—the grassland should be laid down, with the land in the best condition, and having sown this grass conserve it with judicious topdressing. This appears so important and interesting that it is proposed, with the co-operation of some of the agricultural associations, to undertake a careful trial of topdressing.

There were no doubt men who had topdressed before this, but the trial at Ruakura under Clifton's supervision was the first to be carried out systematically.

Experimental farms and agricultural instruction were not the only responsibility of Clifton's division. It was also responsible for noxious weed and rabbit inspection. Much useful work was done on experimental farms, but with the knowledge and experience then available progress could be made only up to a certain point. Without a nucleus of scientifically trained people it was difficult to go beyond that, and up to the First World War there were very few people with a knowledge of scientific agriculture. The limitations of the experimental farms were pointed out by the Secretary for Agriculture in his report for 1912, when he showed that as they were nearly all organised as large mixed farms, they could not show any of the advantages of specialisation. For this reason their value as demonstration farms was weakened, and the Department was not ready to undertake much experimental work. Many trials were made, but the results were not analysed rigorously enough to provide really worthwhile results.



Bernard Cracroft Aston. Agricultural chemistry had its beginning in New Zealand with Aston's appointment to the Department in 1899.

Bernard Cracroft Aston

In the field of animal health Gilruth and his staff had made a sound beginning; Clifton had shown the need for a close study of land utilisation and had devoted a great deal of attention to the problem of pasture improvement, and two other men, Aston and Cockayne, were in the decade before 1914 making a beginning on the study of agricultural chemistry and plant ecology.

Bernard Cracroft Aston was born in England in 1871 and came to New Zealand as a child. He received his training in chemistry from Professor Black in Dunedin, where one of his fellow students was the distinguished ceramic chemist Joseph Mellor. His first appointment was with a cement company; then he was consulting analyst to the Government in Dunedin, and in 1899 he was appointed chemist in the Department of Agriculture. In his earliest investigation into livestock diseases he was associated with Gilruth, but all the while he covered a very wide field. As for some years he was the only agricultural chemist in the country, it is not surprising that his influence on the work of those who came later was very great.

Bush Sickness Investigation

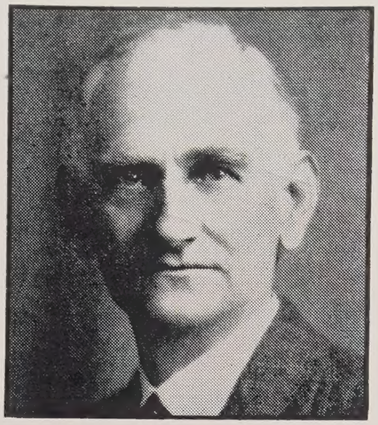
While working with Gilruth, Aston began in the field which was to become peculiarly his own—bush sickness—and the study of the unravelling of the problem forms a fascinating account of the application of scientific method, the false trails that were followed at the start, and the gradual narrowing of the search until the final solution, cobalt deficiency, was discovered in the 1930's. Though Aston himself did not make this particular discovery, his long and intensive search had already resulted in a large measure of progress and his work had been very helpful to others in the same field.

What is most striking today when reading the early reports of the Chemistry Section is the number of elaborate investigations that were made while there was so much routine work to do with such a small staff and such meagre equipment. Aston also did a great deal of work on the analysis of fertilisers and he made a beginning on the task of soil classification. One of his assistants in the earlier years was Theodore Rigg, later Director of the Cawthron Institute.

Alfred Hyde Cockayne

In 1905 Alfred Hyde Cockayne was appointed Assistant Biologist and his first duties were to relieve Kirk of some of the work of insect classification and identification. Up till then the Biology Section had not been able to do much more than distribute a great many pamphlets on insects and blight and report on the specimens sent to it.

The grass garden at Moumahaki had by 1900 some 130 different kinds of grasses and fodder plants in it. It was used for a few simple experiments and later a beginning was made with plant breeding, but the man who was doing it left the Department and took up farming on his own account before any results were obtained.



[*S. P. Andrew Ltd. photo.*

Alfred Hyde Cockayne, who made a significant contribution to the progress of New Zealand farming both as a scientist and administrator from 1905 to 1943.

Cockayne, who was born in 1880, the year his father, Dr. Leonard Cockayne, came to New Zealand, must have grown up in an atmosphere where the study of plants overshadowed everything. Leonard Cockayne from 1887 conducted a private experimental station at New Brighton for botanical research, and besides made a number of botanical expeditions, not only in New Zealand and the Chathams but in the sub-Antarctic islands.

Educated at Canterbury College, the younger Cockayne must have been very well equipped for his task when he joined the Department, and 4 years later he was appointed Biologist and was able to devote himself to more specialised fields. E. Bruce Levy has declared recently:—

> In New Zealand, ecology had its birth and its foundation laid by the late Dr. L. Cockayne. True it is that he applied it most to our native flora and used it extensively in his economic investigation of the montane tussock grasslands of the South Island. Mr. A. H. Cockayne took the science and applied it to the introduced flora and in particular reference to the conversion of the great native flora, studied and beloved by his father, into sown grasslands that were destined to replace these forests.

No doubt the younger Cockayne had already given a great deal of thought to this problem before 1909, but in 1910 in the first number of the "Journal of Agriculture" he published the first of a long series of articles on the grasslands of New Zealand. Among his earlier tasks as Assistant Biologist had been to look into the field of seed purity, and about 1910 he conceived the plan to begin the systematic testing of seeds for germination and purity. This was the genesis of the whole system of seed testing and certification.

Cockayne's staff was very small and apart from the seed testing laboratory the Biology Section had very little equipment and as was to be expected the work was hampered by the outbreak of war. For a year or so it was located at the Weraroa Development Farm, but with the reorganisation of the Department after the war and the recreating of the Fields Division in 1923 under Cockayne's direction his work was able to go forward with a new impetus. Noteworthy progress was made in the next few years, such as the discovery of the special importance of clover in pastures, the discovery of a superior strain of ryegrass, and the work on the gum and pumice lands.

Plant Research Station

The establishment of the Plant Research Station at Palmerston North enabled each aspect of Cockayne's whole field to be studied intensively by specialists. In the same year he was appointed Assistant Director-General and in 1936 became Director-General, retiring in 1943.

The characteristics of both Cockaynes are well brought out by a famous English botanist's description of an outing with them:—

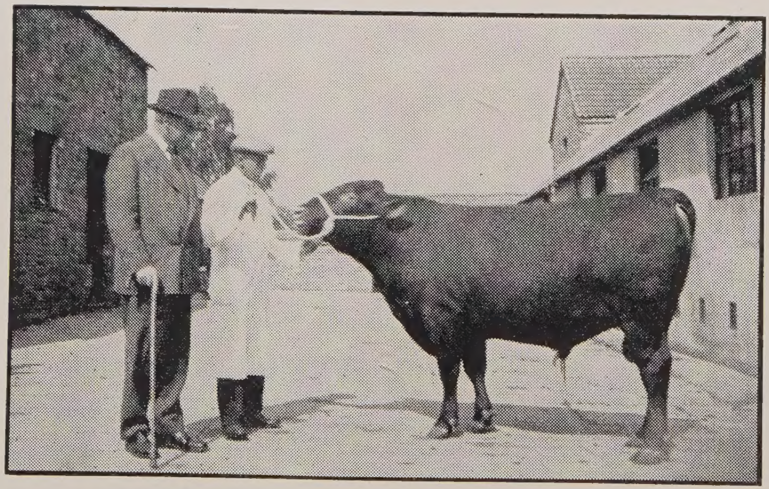
> No matter whether we were in a crowded train or wedged in the back seat of a motor car he [Dr. L. Cockayne] would discuss abstruse botanical matters or bring forward knotty points as to hybrids or what was meant by such and such a species. Then his son Alfred would join in with a totally opposite point of view and a fierce altercation, proving quite harmless, would ensue—an outsider might have thought blows would follow!—and all would end happily.

Over the last 30 years there has been a growing realisation of the importance of scientific research in relation to agriculture and now there are many research workers in fields where before 1914 there was only one or none. This has meant that scientific advance is more the result of concerted team-work than of brilliant individual effort. Many of the research workers today received their early training from men such as Cockayne or Aston and have endeavoured to maintain their standards.

In the brief space of this article one cannot do justice to any and must ignore many of those who have made noteworthy contributions to the Department's work. A comprehensive history would be a very large task.

◆

Viscount Bledisloe's Champion Bull Inspected by New Governor-General



TOP price, 380 guineas, at the Reading Red Poll Cattle Society's last autumn show and sale was given for Viscount Bledisloe's bull Lydney Paddy, shown above, who was also reserve champion and champion in his class. Viscount Bledisloe, who won the esteem of farmers throughout New Zealand during his term as Governor-General and who since his return to Britain has continued to take a keen interest in New Zealand, is still at 85 a prominent figure in British affairs. The photograph, which was taken by Viscount Bledisloe, is of special interest, because in it at left is Lieutenant-General Sir Willoughby Norrie, New Zealand's new Governor-General.

Pig Competitions Show Value of Rapid Growth-rate

PIG carcass competitions over the years have served to maintain interest in the quality of carcass required by the pork and bacon trades. However, it has become clear to the enthusiastic supporter of these competitions that carcass quality alone, without reference to the farm performance of the animals, is inadequate, and may be misleading, as a basis of assessing the merits of a strain of pigs in selecting breeding stock. A. Longwill, Superintendent, Pig Industry, Department of Agriculture, Wellington, reviews in this article competitions held during the past year where farm performance data have been used in the assessment of merit of carcasses.

MAXIMUM profit from pigs, so far as this is dependent on the pig demands:—

Prolific sows with good milking and mothering ability so that the maximum number of thrifty piglets are weaned.

Efficient conversion of the food consumed into meat.

High quality of the carcass at the appropriate weight when marketed so that the maximum market price is obtained.

These facts are obvious and have been well publicised in New Zealand for more than 20 years. Why, then, have attempts to integrate these requirements in judging carcass competitions met with a disappointing response in the past? As a result of the sideline nature of pig raising in New Zealand and the lack of an adequate labour supply to do the job thoroughly, farmers have generally made no attempt to record the farm performance of their pigs. "Recorded pig sections" of competitions which have involved the recording of the litter, usually by an independent officer, have languished simply because very few litters were recorded.

This type of competition is most desirable and, if the difficulties in the way of having more litters recorded can be overcome, competitions restricted to pigs of which farm performance particulars are known should be started in every district in which competitions are organised.

[*Sparrow Industrial Pictures Ltd. photo.*

Mr. A. E. Wood, Whakatane, with his team of four porkers which was placed first in the growth-rate section of the Tomoana competition for the North Island.

Recorded Litters

The Canterbury District Pig Council, in recent years, has accepted entries in its recorded section of litters which have been officially recorded by an officer of the Department of Agriculture, recorded by its own supervisor or herd tester, or, where these systems of recording are not practicable, by the farmer himself, subject to a check of the weights by two other farmers. Although the aim has been to popularise the recording of performance on the farm applicable to entries in the competition, the response has been poor, only 8 per cent. of the 125 entries in the 1952 competition being in the recorded section. However, it is notable that the best baconer in the whole competition was from the best recorded litter. The 11 pigs weaned in this litter weighed 511lb. at 8 weeks of age. Average daily gain from birth to slaughter was .75lb., which under the pointing system adopted by the Canterbury District Pig Council secured full points for growth-rate. The prizewinner in this case was certainly produced at a profit.

Details of the recorded section of the Canterbury competition are worthy of study by all organisers of pig carcass competitions and are given in Table 1.

All place-winners in this section scored the possible farm points. High growth-rate did not impair carcass quality. There is evidence that there is no reason to fear this provided the litter is given a good start. A high level of nutrition in the early months of a pig's life ensures the development of lean meat, which is really the foundation of carcass quality as recognised by present market standards. Once the lean meat has been built up there is much less danger of the pig being overfattened in finishing, for the amount of fat a carcass should carry is relative to the amount of lean meat—the more lean the more fat required for ideal conformation and prime condition.

TABLE 1—POINTS FOR RECORDED ENTRIES IN CANTERBURY DISTRICT PIG COUNCIL BACONER COMPETITION

Competitor	No. born/ weaned	Points awarded	Litter weight 8 weeks	Points awarded	Daily growth gain	Points awarded	Total farm points	Carcass points	Grand total	Place
Possible points ..	10 +	10	lb. 400 +	20	lb. .75 +	20	50	100	150	
F. D. Higgins ..	16/11	10	511	20	.75	20	50	85	135	1
V. H. Moore ..	14/10	10	450	20	.77	20	50	78	128	2
F. D. Higgins ..	16/11	10	511	20	.76	20	50	72	122	3 =
V. H. Moore ..	14/10	10	450	20	.81	20	50	72	122	3 =
H. E. Hodgkinson ..	16/8	8	332	13	.79	20	41	69	110	
H. E. Hodgkinson ..	9/8	8	327	12	.79	20	40	65	105	
A. W. Quigley ..	11/10	10	354	15	.57	10	35	65	100	
C. E. Watkins ..	13/11	10	346	14	.67	14	38	61	99	
A. W. Quigley ..	10/10	10	365	16	.64	13	39	58	97	
A. W. Quigley ..	9/9	9	311	11	.58	10	30	65	95	

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Growth-rate Points

The difficulty, under present conditions, of getting litter recording carried out on the average farm has led to an attempt to apply the check of profitability of production through incorporating growth-rate points in carcass competitions.

Though this does not give as complete a story of farm performance as is obtained in the recorded section described, it is felt to be a worthwhile compromise because:—

It is practicable with the minimum of recording. Nothing more is needed than the date of birth and ability to identify pigs from each sow up to the time of slaughter.

When the points for growth-rate are coupled with carcass points in the proportion of 25 : 100 the winner is a high-quality carcass which has been grown reasonably fast. Thus is eliminated the undesirable possibility of a slowly grown, unprofitable pig winning.

It focuses attention on the need for early rapid growth to build the foundation of lean meat. Further, it will serve to emphasise that this is the profitable way to grow pigs.

Strains of pigs inevitably get some publicity as a result of winning carcass competitions. Those strains which achieve this distinction, and do it profitably, are worthy of such publicity.

Although rapid growth is not exactly the same thing as efficient conversion of food into meat, it is the best measure that can be used on the farm short of individual feeding of litter groups and recording of the food used.

TABLE 2—NUMBER OF TEAMS JUDGED IN GROWTH-RATE SECTION, 1952

	Porkers	Baconers	Total	Total teams in competition
Tomoana works	24	9	33	163
Patea works	12	7	19	324
Westfield works	28	24	52	706
Total	64	40	104	1,193
Number of teams scoring 70 per cent. of possible points	36	9	45	
Per cent. of total teams judged ..	56	22½	43	

All-round Merit

The weighting of points—25 for growth-rate to 100 points for carcass—precludes the possibility of unsuitable types of pig winning as a result of fast growth-rate alone. In other words, the final assessment is one of all-round merit with a high-quality carcass as the principal requirement.

The table of growth-rate points is based on a reasonably good standard of growth-rate throughout. The standard is "normal" in that it accords with the normal growth-rates of pigs and can therefore be used with fairness for pigs of all weights. Thus the

TABLE 3—TEAMS GAINING 70 PER CENT. OR MORE OF TOTAL POINTS IN GROWTH-RATE SECTION, 1952: PORKERS

Entrant	Breeding	Date of birth	Av. dead wt. (lb.)	Age at slaughter (days)	Standard age for wt. (days)	Points		
						Growth-rate	Carcass	Total
A. E. Wood, Whakatane	B. x L.W.	22/12/51	84.5	115	126	100	341	441
H. and N. Myers, Mauriceville ..	L.W. x (T. x B.)	21/1/52	74	108	115	100	330	430
H. J. Billington, Hukanui	L.W. x T	26/12/51	73	105	114	100	328	428
M. E. Bull, Gisborne	B. x L.W.	7/12/51	80	124	121	93	334	427
H. E. C. Billington, Hukanui ..	T. x L.W.	24/1/52	75	98	116	100	323	423
*R. A. Julian, Kakaramea	L.W.	3/12/51	76	123	117	86	336	422
M. E. Bull, Gisborne	B. x L.W.	3/8/51	78	124	119	91	330	421
J. W. Wilson, Norsewood	L.W.	30/9/51	72.5	115	114	96	324	420
H. J. Billington, Hukanui	T. x L.W.	26/12/51	75	113	116	97	321	418
Ian Billington, Hukanui	T. x L.W.	21/1/52	75	101	116	100	313	413
J. W. Wilson, Norsewood	L.W.	23/10/51	73	120	114	89	324	413
H. and N. Myers, Mauriceville ..	L.W. x (T. x B.)	4/1/52	77	104	118	100	312	412
N. H. Slater, Waharoa	L.W.	15/11/51	81	117	122	100	310	410
O. R. Russell, Makotuku	L.W.	25/11/51	80	129	121	85	325	410
L. T. R. Nicholson, Lichfield ..	L.W. x (B. x L.W.)	6/12/51	79	123	120	94	313	407
Ian Billington, Hukanui	T. x L.W.	21/1/52	75	108	116	100	303	403
J. F. Bremner, Pahiatua	L.W.	29/11/51	81	131	122	83	318	401
C. H. Brown, Makerua	L.W. x B.	16/11/51	85	118	126	100	300	400
W. R. Johnstone, Runciman	T.	2/9/51	81½	129	123	87	311	398
H. M. Winters, Pye's Pa, Tauranga	L.W.	20/11/51	81	120	122	96	301	397
E. Griffin, Inaha	Duroc x L.B.	17/12/51	77	121	118	95	298	393
C. H. Costar, Kaiaua	L.W. x B.	16/10/51	101½	141	143	98	293	391
S. Williamson, Otorohanga	L.W. x B.	4/2/52	72	114	113	93	297	390
H. E. C. Billington, Hukanui ..	L.W. x T.	24/1/52	80	133	121	75	313	388
N. S. Barkla, Meremere	L.W. x L.B.	27/11/51	74	128	115	71	317	388
Fowell Bros., Whitford	B. x L.W.	18/12/51	78	134	119	69	318	387
C. Darby, Bombay	Duroc x T.	31/10/51	91	134	132	95	283	378
A. F. Henderson, Waitakaruru ..	L.W. x B.	16/1/52	89	124	130	100	277	377
W. Barnaby, Tuakau	L.B. x B.	10/12/51	80	115	121	100	277	377
A. J. and E. W. Young, Opotiki ..	L.W.	12/12/51	69	127	110	60	315	375
*R. A. Julian, Kakaramea	L.W.	28/11/51	73	140	114	40	334	374
G. W. Hickey and Son, Waiuku ..	L.W.	5/12/51	78	141	119	52	318	370
L. McDonald, Bombay	L.W.	31/10/51	85	147	126	58	310	368
K. W. Jackson, Inglewood	L.W.	12/12/51	80	152	121	33	334	367
W. Barnaby, Tuakau	L.B. x B.	10/12/51	88½	141	130	79	288	367
H. Ramsay, Papakura	T. x B.	19/11/51	103	129	144	100	265	365

* Whey feeder

TABLE 4—TEAMS GAINING 70 PER CENT. OR MORE OF TOTAL POINTS IN GROWTH-RATE SECTION, 1952: BACONERS

Entrant	Breeding	Date of birth	Av. dead wt. (lb.)	Age at slaughter (days)	Standard age for wt. (days)	Points		
						Growth-rate	Carcass	Total
C. H. Costar, Kaiaua	L.W. x B.	27/10/51	143	172	184	100	329	429
S. Williamson, Otorohanga	L.W. x B.	7/7/51	139	186	180	91	309	400
J. F. Bremner, Pahiatua	L.W.	22/10/51	138	197	179	71	324	395
J. W. Wilson, Norsewood	L.W.	9/11/51	141½	187	183	93	299	392
S. Williamson, Otorohanga	L.W. x B.	12/7/51	141½	202	183	71	321	392
H. and N. Myers, Mauriceville ..	L.W.	14/9/51	150	207	190	77	310	387
B. D. Wright, Pukekohe East ..	L.W. x B.	16/7/51	146	220	187	50	325	375
C. Dewhurst, Puni	B.	20/10/51	137	197	178	71	300	371
G. McNeice, Paeroa	L.W. x L.B.	11/9/51	150½	162	191	100	271	371

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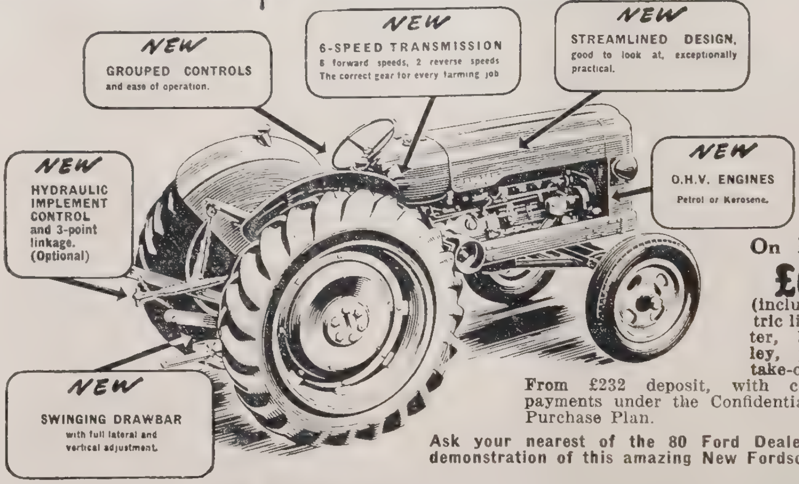
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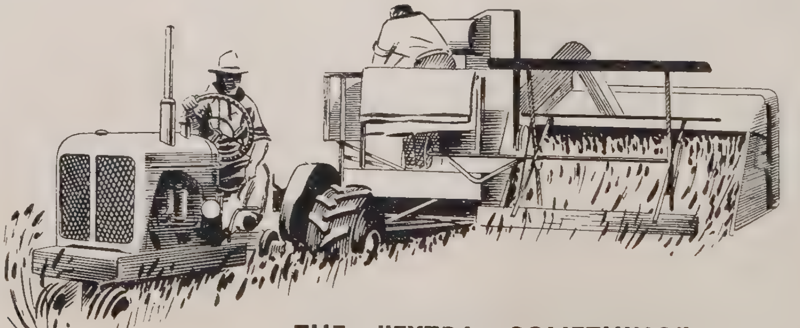

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standard growth-rate for an 80lb. porker is one which enables the pig to reach this weight in 121 days—or 0.66lb. carcass gain daily average from birth to slaughter. For a 160lb. baconer, however, the age at slaughter must be under 200 days for full points or an average daily carcass gain of 0.80lb.

This moving standard on a daily gain basis is preferable to the standard daily gain of 0.75lb. used in the Canterbury competition irrespective of the weight of the pig when slaughtered.

North Island Competition

From small beginnings the growth-rate section of W. and R. Fletcher (N.Z.) Ltd.'s Tomoana competition has grown until this year there were over 100 entries, each of a team of 4 pigs in this section. Though this is still only 8 per cent. of the total entries in this large competition, it is a considerable advance on the previous figures and shows that a growing number of producers are taking an interest in this aspect of their pig production.

Table 2 shows the entries in this section at each of the three works over which the competition is conducted. The percentage of the teams which came up to the "merit" standard of securing 70 per cent. of the possible points is shown separately for porkers and baconers.

[*Sparrow Industrial Pictures Ltd. photo.*

The panel of judges who officiated in the final judging of the Tomoana porker and baconer championships at Westfield in July 1952. Top (left to right): Messrs. A. E. Ramsay, F. Merritt, D. J. Sinclair, H. Howard, M. Bailey. Bottom: Messrs. J. Anderson, T. Marks, H. Traill, G. Paine.

[*Sparrow Industrial Pictures Ltd. photo.*

Mr. C. H. Costar, Kaiaua, Pokeno, whose team of baconers gave the best performance in the baconer growth-rate section of the Tomoana competition for the North Island.

The higher proportion of porker teams reaching merit standard reflects the fact that it is essential to have rapid growth in order to produce the high-quality, meaty porker carcass. With baconers, however, a more specialised baconer type, later maturing but capable of rapid growth without becoming overfat, is necessary to ensure maximum profit. The inclusion of growth-rate points, therefore, provides a valuable "screen" in the process of selecting stock for further breeding.

Results of 1952 Competition

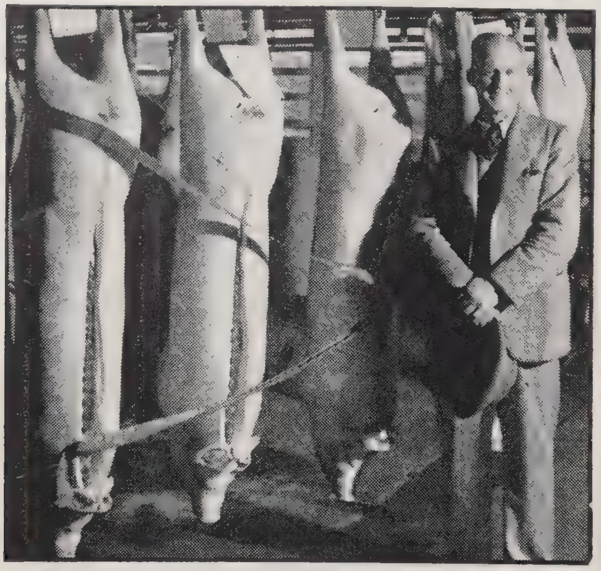
Table 3 gives particulars of the 36 entries out of the total of 64 in the porker section which gained 70 per cent. or more of the possible points.

Table 3 shows that Large White and crosses with that breed have performed exceptionally well. As will be seen in Table 4 the same applies to baconers.

The date of birth is given because fluctuations in the normal feed supply and climatic conditions generally may have a considerable effect on performance. No allowance has been made for these effects or the fact that some pigs were raised on whey, so that individual assessments will have to be made of the general merit of performances, taking these factors into consideration.

Besides the average dressed weight of the 4 pigs in the team their age in days at the time of consignment from the farm (in preference to the slaughter date to give equal treatment in terms of feeding period) is stated together with the standard age for pigs of the weight as laid down in the standards used for judging growth-rate. This will give a measure of the extent to which the performances of the various teams are better or worse than the standard.

It would appear from a study of Table 3 that the standard laid down



[*Sparrow Industrial Pictures Ltd. photo.*

Mr. W. G. Bell with the team of baconers which won the straightout carcass championship in the North Island competition.

TABLE 5—TEAMS SCORING 80 PER CENT. OR MORE OF POSSIBLE POINTS (CARCASS ONLY)

Baconers

Entrant	Breeding	Points
W. G. Bell, Ardmore	L.W.	348
V. S. Cope, Whitford	L.W.	346
The Mission Station, Green Meadows, Hastings	L.W. x B.	345
C. E. Schwass, Pakowhai Station, Gisborne	L.W. x (B. x T.)	344
W. G. Bell, Ardmore	L.W.	344
T. W. Sewell, Gisborne	L.W. x B.	339
F. A. Buckley, Gisborne	T. x B.	337
B. M. Sewell, Gisborne	L.W. x B.	336

Porkers

Entrant	Breeding	Points
Te Papapa Piggeries, Auckland	L.W. x	343
N. A. Fraser, Kawakawa	L.W.	342
A E. Wood, Whakatane	B. x L.W.	341
H. S. Furze, New Plymouth	L.W.	340
R J. Haseltine, Stratford	L.W. x B.	339
T. W. Sewell, Gisborne	L.W. x B.	338
Mrs. A. H. Armstrong, Stratford	L.W. x B.	337
R. A. Julian, Kakaramea	L.W.	336

Combined

Entrant	Breeding	Points
W. G. Bell, Ardmore	L.W.	678

as a basis of judging growth-rate is a practical one well suited to the purpose. As a result of experience it may be possible to make adjustments to allow for the difference between whey and skimmed milk feeding and date of birth. In the meantime this has not been attempted.

The second highest scoring team of porkers on a carcass basis, that of R. A. Julian, Kakaramea, received whey as their basic food and allowance for this must be made in comparing their performance with that of the next four teams above them. The winning team of porkers were within 2 points of the best in the whole competition. The fact that they were grown in shorter time by 11 days than the standard for their weight stamps the performance as an outstanding one.

Linton Farm's Small Lamb

THE accompanying photograph shows a small lamb which was born in the flock of Mr. F. H. Moody of Linton. The ewe was a 4-tooth Romney and had reared a normal lamb in the previous season. The small lamb, which was sired by a Southdown ram, was a single lamb and is perfectly formed and very fit and lively. The photograph shows the small lamb with a normal lamb of the same age—1 week old.

Baconer Section

Table 4 gives the same range of particulars for the 9 baconer teams out of the 40 entered which reached merit standard.

The range of growth-rate and carcass points—from 29 days less than standard, but with carcass quality suffering, to 33 days older than standard, but with a good carcass score—indicates that some teams are making merit standard, but are rather weak in one aspect of the performance "double". However, a good double can be achieved, as is shown by the performance of the first team in this section, which, though 12 days younger than standard, achieved the highest carcass score in the section.

Economy in Gains

The importance of rapid gains in the economics of pig production can readily be appreciated when the performances of the quickest- and slowest-grown teams in the various sections are contrasted.

In the porker teams it is estimated that this is sufficient to mean a difference in profit of 25s. per pig for the same amount of feed used. In the baconers the difference is approximately £2 per pig. For one litter of baconers and one of porkers from a sow in a season this means a difference in profit of the order of £24 per sow due to growth ability and efficiency of feed conversion. Surely this is an important feature to measure and select stock for.

Keep a record of farrowing dates and make sure the pigs of each sow can be identified until they go to slaughter. This will give a check on the growth ability of the progeny of each sow, which when added to the other aspects of the sow's performance, such as ability to rear larger litters and breed regularly, will enable a better selection for further breeding to be carried out.

Carcass Competition

Results of the carcass section of the Tomoana competition without any reference to farm performance are given in Table 5. Eight teams in both baconer and porker sections of the competition secured 80 per cent. of the possible points. These are the only ones included in Table 5.

◆

New Edition of "Primary Production in New Zealand"

A COMPLETELY revised edition of the Department of Agriculture's publication "Primary Production in New Zealand" is now available from main offices of the Department at 2s. 6d. (post free). The aim of this book is to provide in compact form a comprehensive picture of the Dominion's primary industries.

The 1952 edition, which contains 160 pages, including 16 pages of illustrations on art paper and 19 maps, has been expanded, particularly the section on marketing. There is a wealth of statistical data relating to land use and quantities and value of products.

◆

Recognition of Good and Poor Layers in Household Poultry

THOUGH usually household poultry keepers are not concerned with selecting birds for breeding, they should be able to pick out the non-producer and may at the end of a laying season wish to know which birds are worth saving for another season. Some experience is required to distinguish poor from good laying birds, but with even a limited knowledge of what to look for a poultry keeper can prevent a waste of expensive food by culling non-producers and with a reasonable degree of accuracy choose the best birds to hold over for another season. This article by the Animal Industry Division discusses the points which stamp a bird as a good or poor producer.

CULLING, that is the removal of unprofitable or poor-producing birds, is a management operation which should be carried out from time to time by all classes of poultry producers. The tendency among non-specialist poultry producers, such as the householder, is to feel that all laying birds look alike; in other words they are all "just hens". Usually this is far from true. Even in a small flock, say 6 to 12 birds, hens will vary in production ability and appearance. There will be the heavy producer and may even be the non-producer. Though there are no infallible rules for distinguishing one type from the other, close observation will lead to the discovery of significant differences which are helpful both in culling and in selecting the best birds for carrying over from one year to the next.

Culling

Culling may be done at any time of year and in fact should be carried out whenever necessary. Most household poultry keepers practise the simplest form of culling—the removal of sick birds. These are easily recognised and the owner rightly fears that a sick bird may well be a source of infection for the remainder of the pen. The next step is the removal of the non-producer and if possible the poor producer.

The valuable birds are those which will lay during winter, when eggs are scarcest and most expensive. Successful winter egg production depends a great deal on environment (good housing, etc.) and management (proper feeding, dry litter, freedom from draughts and cold). Pullets from excellent laying strains kept under poor conditions and indifferently managed are unlikely to give satisfactory winter egg production.

The household producer should make certain that housing conditions, feeding, and general management are satisfactory before attributing poor production to the birds. Culling of non-producers among pullets during autumn and early winter must be done carefully, as the pullets may not have reached maturity. However, a pullet not in lay by May or June, even if late hatched, is unlikely to be an economical one to retain. It should be culled and, if in good condition, eaten.

Earlier-hatched birds should be in lay well before May and should not be carried right through the winter as "passengers" if they do not produce eggs. Any pullet or hen not in lay in spring (September onward) has already been in the pen too long and should be removed without further delay.

Depending upon circumstances, such as when the pullets were hatched, the particular season, and the weather, birds may come into lay early in the year, lay well for a period, and then go into a moult, usually a partial moult or neck moult, though sometimes a full moult. Such birds go out of production and may be out for 4 to 6 weeks. These birds should not be culled unless they are of obviously poor appearance or do not come back into production within a reasonable time—at least before September.

Recognising Bird in Lay

There are two ways of determining whether a pullet or a hen, irrespective of breed, is in lay, which if both taken into consideration at the same time will prove reasonably accurate. First the bird should be picked up and examined, when the following differences can be noted between layers and non-layers.

	In lay	Out of lay
Comb:	Red and fully developed for breed	Undeveloped or shrivelled and pale
Face:	Red	Lacking bloom and red colour
Vent:	Large and moist	Small and dry

A further method of checking is to feel the pelvic bones. These are two pointed bones immediately above the vent and can be found quite easily. With a bird in lay, when the vent is moist, it will be found that these two bones have opened outward, allowing say, two or three fingers to be placed between them. When the bird is out of production or has not laid the pelvic bones are comparatively close together.

For experience a poultry keeper should examine new season's pullets when they are almost fully grown but before they have laid and note the condition of the comb, head, vent, and pelvic bones. Later when it is easy to pick out a bird which has laid it should be examined and the changes noted in each of the various parts. With this knowledge it should then

Reminders for December

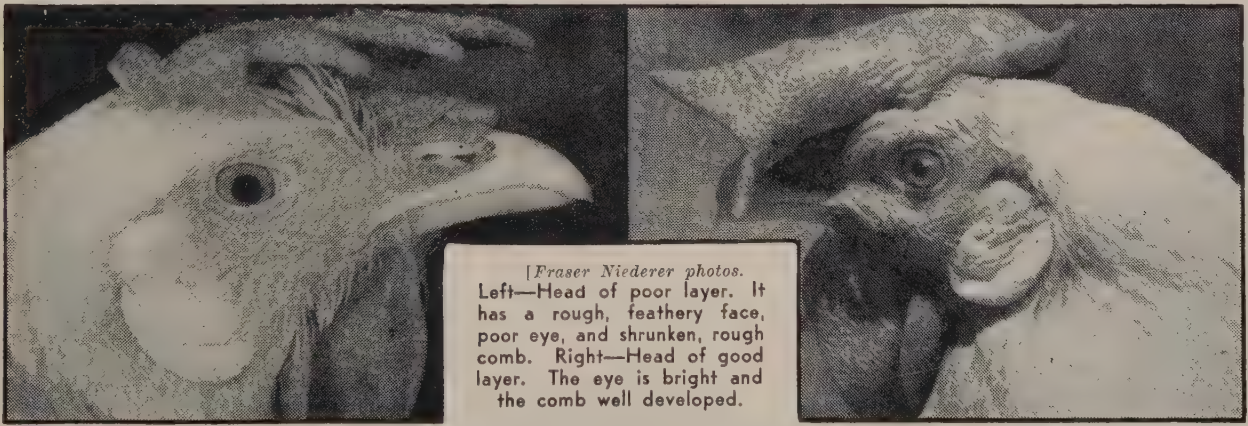
In hot weather birds require plenty of fresh water, preferably placed in a position shaded from the sun. Tepid water is not palatable.

Shade is appreciated by birds during hot weather.

Any laying birds which go into a moult during the month should be disposed of immediately.

Fresh, young greenfeed, not old fibrous vegetation, should be supplied regularly. This point should be watched carefully during dry weather.

A watch should be kept for lice on birds and for red mites under perches and in nest boxes. Both multiply rapidly at this season.



[Fraser Niederer photos.

Left—Head of poor layer. It has a rough, feathery face, poor eye, and shrunken, rough comb. Right—Head of good layer. The eye is bright and the comb well developed.

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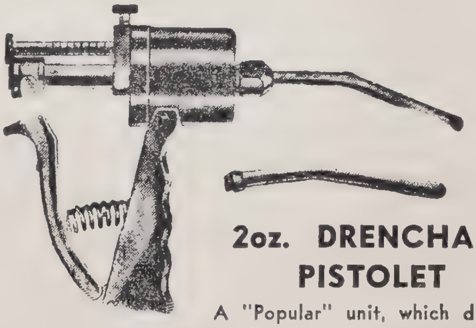

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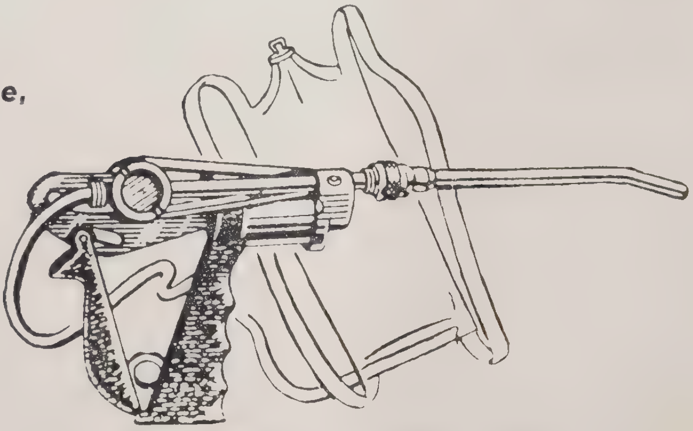

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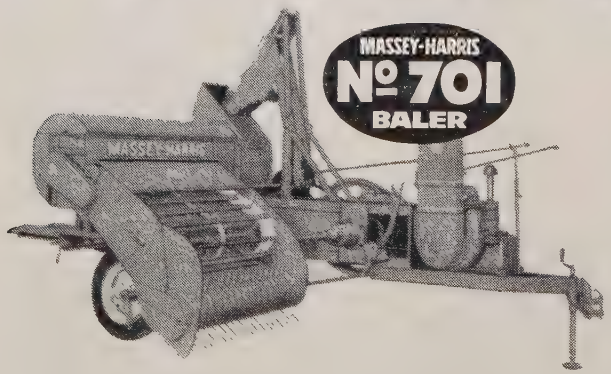

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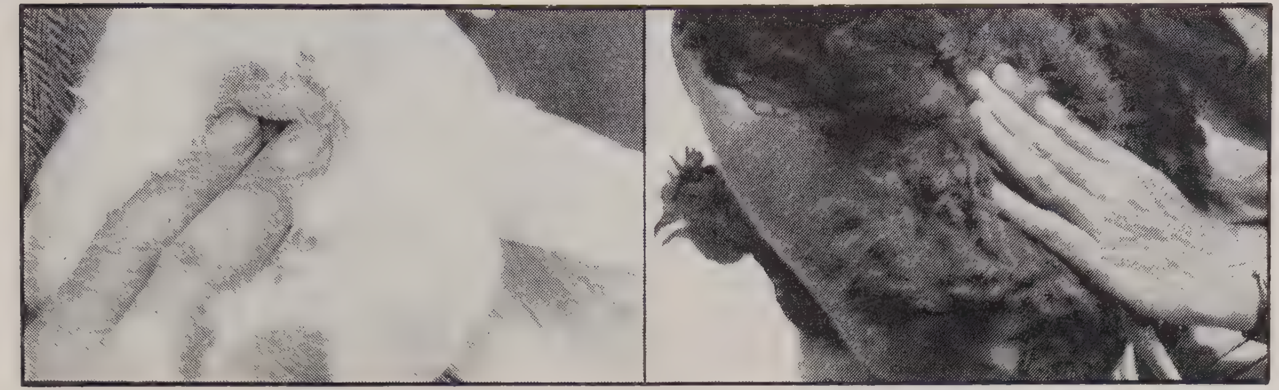


[Photograph at right by Fraser Niederer.

Measuring distance between pelvic bones. Left—A bare 2-finger distance between the bones of a bird out of lay. Right—A full 3-finger distance between the bones.

not be difficult to recognise the full-grown bird which is out of production from among a group of pullets in lay.

Pullets or Hens

Every year the household poultry keeper has to decide how many new pullets will be required and whether to carry over some of the current year's laying birds for another season. The question of the relative value of pullets and hens is one worth careful consideration. The factors involved are as follows:—

Pullet	Hen
Normally lays more eggs during first year than at any other time.	Lays approximately one third fewer eggs than in pullet year.
If hatched at proper time according to breed, should lay under good management during winter.	If a good layer during pullet year, will be in a normal annual moult during late autumn and winter until July or August, when eggs are scarce and dear.
Lays smaller eggs at start of laying period.	Lays a full-size egg.
Under average circumstances more losses (deaths and sickness) may be expected in the first laying year.	With average healthy stocks there will be fewer losses among hens than among pullets.
Pullets during and at the end of their first laying year are fairly good for table birds.	Every year after the pullet year a layer becomes poorer as a table bird. Old birds are tough.
Pullets are expensive.	

To the comparisons outlined above must be added certain other considerations. Pullets vary individually in the number of eggs laid during their first laying season or pullet year. As any of these pullets in their second year as hens will lay fewer eggs than during the first year, only the best layers are worth keeping for a second season, if the owner decides to keep some birds for 2 years.

It is not easy to pick out the best layers during their pullet year; unless experienced the householder may easily hold over some poor layers. The fact that new season pullets and adult laying birds must not be run together raises a further issue. Where birds are held over for two laying seasons and new pullets introduced to replace losses and culls the laying shed must have two compartments to keep the two age groups separate, at least until the time when the new pullets are fully grown and mature.

A complete replacement of laying birds with new pullets each year involves heavier initial expense, but with good stock and careful management a greater total of eggs can be expected. Perhaps as important is that there should be a supply of eggs throughout winter. If all the birds are retained for a second year of lay, fewer eggs in total over the year must be expected and very few eggs will be available through the winter, but there is no outlay on new pullets. A half-way policy of keeping what are considered the best birds for a second year and filling up with new season pullets ensures a reasonable supply of eggs throughout the year, the number of eggs laid in winter depending on how many replacement pullets are brought in at the beginning of the year.

The retaining of even the best birds for more than two laying seasons cannot be recommended.

Selecting the Best Layers

There is a limited connection between the outward appearance of pullets, their handling qualities, and their potential ability to produce eggs. The experienced commercial poultry farmer uses his experience and stock sense to select his best laying pullets for retention in the second laying year; usually those so selected are used for breeding.

Usually it is easier to assess characteristics associated with a good layer in White Leghorns than in heavy breeds such as Australorps, but the average household poultry keeper cannot be expected to acquire easily the knowledge to recognise the finer points which are guides to selection. His basis must be simpler. Fortunately there are one or two points about pullets that can be observed and recorded easily.

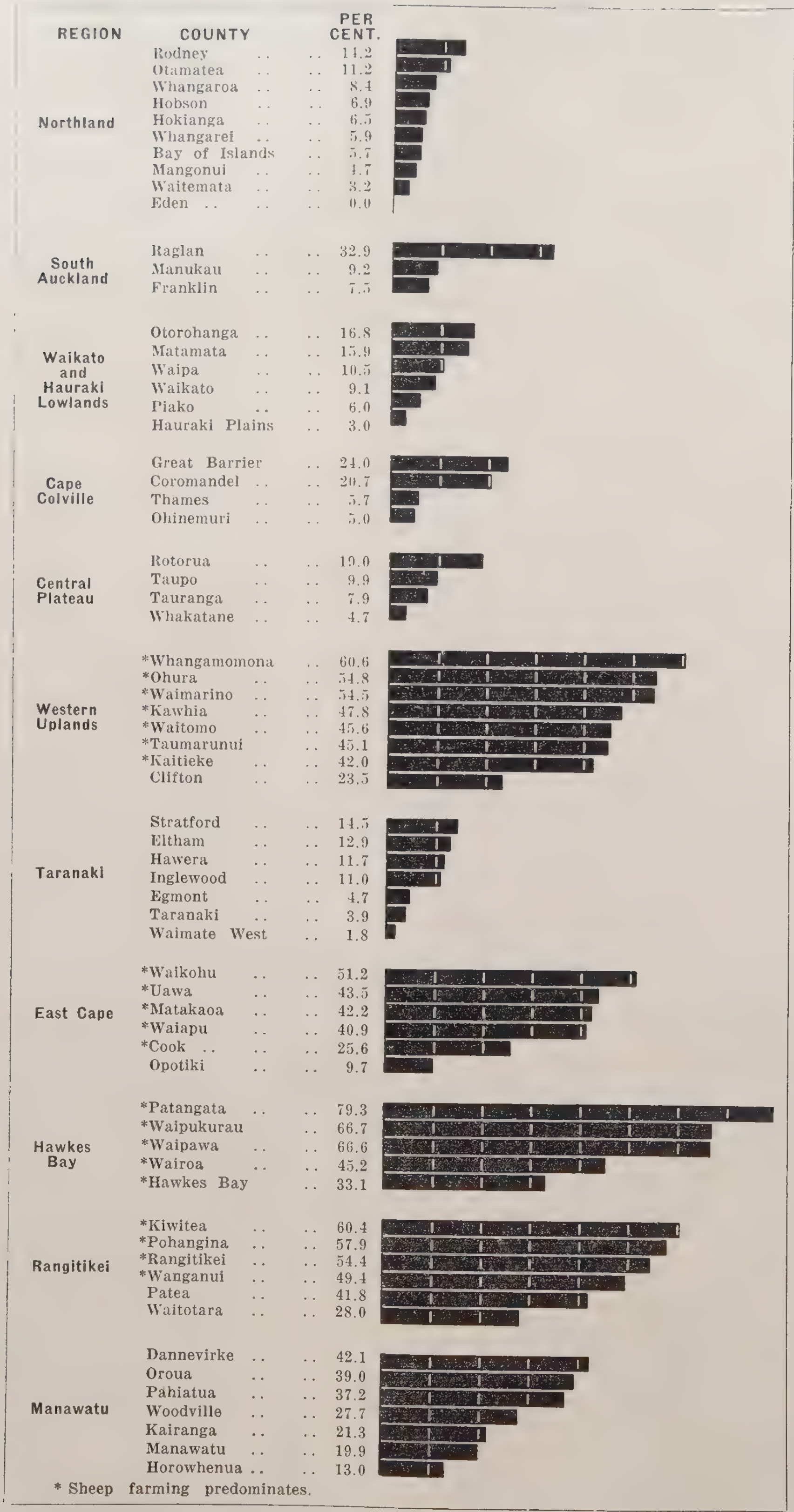
Birds which come into lay early—that is, the first to come into lay of any group—and those which lay into late summer or early autumn are usually the best layers. Late starters and those which go into a moult early (in January or February) are the poor producers and ones which should not be kept for a second year. After being selected by careful observation early-maturing pullets and those which persist with their laying late into the season—those to be retained for a second year of laying—can be marked with leg bands or rings. Celluloid or plastic rings or bands of different colours are usually available from firms which sell poultry foods or from hardware shops. The sizes vary according to whether the bands or rings are required for light breeds such as White Leghorns or heavy breed birds such as Australorps.

Birds which lay during winter and then lay late into the season are the best layers. Birds which moult early should be disposed of as soon as they go out of lay and show signs of moulting.

By leg banding birds as described such birds are easily distinguished from new pullets brought in when the latter reach maturity. This prevents second-year birds being kept for a third year by mistake.

Occasionally a bird with a fairly well-developed comb and bright face may be found to have a small vent, indicating that the bird is out of lay. Usually the abdomen (rear portion of the body below the vent) of such a bird is hard or very tight. Usually this hardness is caused by excessive fat and such birds should be discarded. The odd fat bird of this kind among say six or a dozen birds does not mean that the birds have been overfed or fed with food that is too fattening. As with humans or animals some pullets or hens naturally tend to put on excessive fat. The birds convert food to flesh instead of eggs, and there is no means of overcoming this. If the amount of food given to the birds is reduced, it is likely that the good laying bird will be underfed and its production will be affected.

Intensity of Sheep Farming



By W. N. PATON, Senior Investigational Officer, Department of Agriculture, Wellington

EARLIER articles in this series, which is based on detailed classification of data on agricultural and pastoral holdings obtained in the 1949-50 season's special collection for the 1950 World Census of Agriculture, have dealt with types of farming practised in New Zealand, the popularity of the various types of farming, and the intensity of dairy farming counties. This article discusses the sheep farming group, which is comprised of all holdings where 50 per cent. or more of the farming activities concern sheep farming in one form or another. The percentage of sheep farming holdings to all holdings in a county is shown for each county in the accompanying graphs. An asterisk is shown against the names of counties where more holdings are devoted to sheep farming than to any other main type of farming.

SHEEP farming predominates in 25 counties in the North Island and 28 in the South Island as well as in the Chatham Islands. Ranked in descending order of the percentage of holdings devoted to sheep farming within a county, those counties above 60 per cent. are: Akitio (89.0 per cent.), Weber (85.9 per cent.), Patangata (79.3 per cent.), Mackenzie (75.5 per cent.), Castlepoint (73.0 per cent.), Awatere (71.9 per cent.), Waipara (71.6 per cent.), Maniatoto (70.3 per cent.), Chatham Islands (68.4 per cent.), Waipukurau (66.7 per cent.), Waipawa (66.6 per cent.), Sounds (65.8 per cent.), Cheviot (62.7 per cent.), Waihemo (61.3 per cent.), Whangamomona (60.6 per cent.), and Kiwitea (60.4 per cent.).

There is only one farming region in New Zealand where sheep farming highly predominates throughout and that is Castlepoint, comprised of Weber, Akitio, and Castlepoint Counties. If it were not for the unsuitability of county boundaries in reflecting farming patterns, other districts or regions would show up more or less on a similar sheep farming level to that of Castlepoint. A continuous strip from about Cape Kidnappers in the north to about Cape Palliser in the south would show a very high incidence of sheep farming. Similarly a strip of foothill country east of the Southern Alps of the South Island would be found to be confined mainly to sheep farming.

Hill-country Sheep Farming

Much hill-country sheep farming in the North Island is not very well reflected by the county boundaries. It adjoins the more or less continuous series of mountain ranges stretching from East Cape in the north east to the northern portion of the Tararuas in the south, and takes in the central mountainous and uplands portion of the North Island. Evidence of this is apparent in the high sheep farming percentages shown by counties such as Waipawa, Kiwitea, Pohangina, Whangamomona, Ohura, Waimarino, and Rangitikei. Several counties, however, contain so much lowland country, devoted

in Counties in New Zealand

mainly to dairying, that the total percentage for sheep farming does not stand high.

Least Intensive Sheep Farming Counties

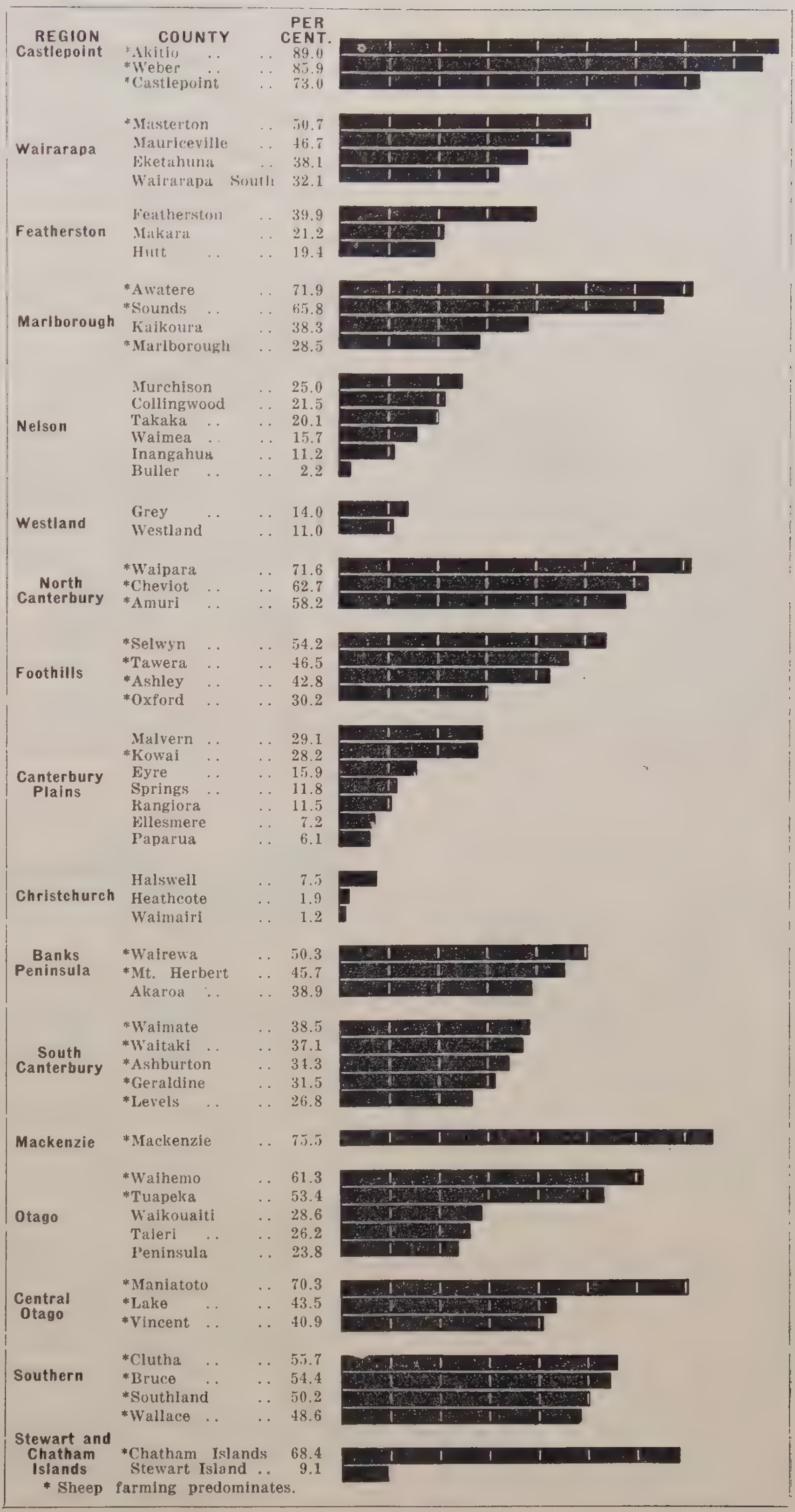
The following list gives the counties, with their percentages in parentheses, where the number of holdings devoted to sheep farming is less than 10 per cent. of the total: Eden (0.0), Waimairi (1.2), Waimate West (1.8), Heathcote (1.9), Buller (2.2), Hauraki Plains (3.0), Waitemata (3.2), Taranaki (3.9), Mangonui (4.7), Whakatane (4.7), Egmont (4.7), Ohinemuri (5.0), Thames (5.7), Bay of Islands (5.7), Whangarei (5.9), Piako (6.0), Paparua (6.1), Hokianga (6.5), Hobson (6.9), Ellesmere (7.2), Franklin (7.5), Halswell (7.5), Tauranga (7.9), Whangaroa (8.4), Waikato (9.1), Stewart Island (9.1), Manukau (9.2), Opotiki (9.7), and Taupo (9.9).

The table below groups the counties according to their percentages:—

Percentage range	North Island	South Island	New Zealand
Over 80	2	—	2
70 and under 80 ..	2	4	6
60 and under 70 ..	4	4	8
50 and under 60 ..	6	7	13
40 and under 50 ..	12	6	18
30 and under 40 ..	7	7	14
20 and under 30 ..	8	10	18
10 and under 20 ..	13	7	20
Under 10	22	7	29
Totals ..	76	52	128

Sheep farming is concentrated mainly in those districts and regions which are least suitable for dairying. There are two main exceptions to this—fat-lamb farming on highly suitable dairy land and milk-production farms for town supply on land which is close to the supply centre, but which necessitates high-level supplementary feeding of stock. Dairying is much more favoured than sheep farming throughout New Zealand, because one-man farms cost appreciably less, require less working capital and practically no reserve for poor years, and can be successfully undertaken with much less previous experience. Dairying is not normally practised in areas of very low rainfall or on tussock and danthonia hill country, and fat-lamb farming is not carried out on low-lying and poorly drained alluvial flats and swamp-lands. That the incidence of sheep farming is higher than that of dairy farming in high-rainfall areas such as the back country of Taranaki and adjoining uplands from Kawhia to Waimarino may be surprising to some. This region is known as the Western Uplands, and although there is an appreciable amount of dairying in it, sheep farming is more general except in Clifton County.

Sheep farming is often practised in combination with dairying in the North Island and with cropping, but less often with dairying, in the South Island. This tendency, together with the greatly increased use of dairy-type pasture land for fat-lamb production, makes it difficult to define closely areas of use for the two main types of farming.



REGION	COUNTY	PER CENT.
Castlepoint	*Akitio	89.0
	*Weber	85.9
	*Castlepoint ..	73.0
Wairarapa	*Masterton ..	50.7
	Mauriceville ..	46.7
	Eketahuna ..	38.1
	Wairarapa South	32.1
Featherston	Featherston ..	39.9
	Makara ..	21.2
	Hutt	19.4
Marlborough	*Awatere ..	71.9
	*Sounds	65.8
	Kaikoura ..	38.3
	*Marlborough ..	28.5
Nelson	Murchison ..	25.0
	Collingwood ..	21.5
	Takaka	20.1
	Waimea	15.7
	Inangahua ..	11.2
	Buller	2.2
Westland	Grey	14.0
	Westland ..	11.0
North Canterbury	*Waipara ..	71.6
	*Cheviot	62.7
	*Amuri	58.2
Foothills	*Selwyn	54.2
	*Tawera	46.5
	*Ashley	42.8
	*Oxford	30.2
Canterbury Plains	Malvern	29.1
	*Kowai	28.2
	Eyre	15.9
	Springs	11.8
	Rangiora ..	11.5
	Ellesmere ..	7.2
	Paparua ..	6.1
Christchurch	Halswell ..	7.5
	Heathcote ..	1.9
	Waimairi ..	1.2
Banks Peninsula	*Wairewa ..	50.3
	*Mt. Herbert ..	45.7
	Akaroa	38.9
South Canterbury	*Waimate ..	38.5
	*Waitaki	37.1
	*Ashburton ..	34.3
	*Geraldine ..	31.5
	*Levels	26.8
Mackenzie	*Mackenzie ..	75.5
Otago	*Waihemo ..	61.3
	*Tuapeka ..	53.4
	Waikouaiti ..	28.6
	Taieri	26.2
	Peninsula ..	23.8
Central Otago	*Maniatoto ..	70.3
	*Lake	43.5
	*Vincent	40.9
Southern	*Clutha	55.7
	*Bruce	54.4
	*Southland ..	50.2
	*Wallace	48.6
Stewart and Chatham Islands	*Chatham Islands	68.4
	Stewart Island ..	9.1

* Sheep farming predominates.

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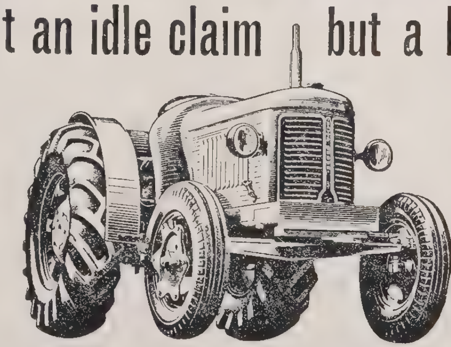

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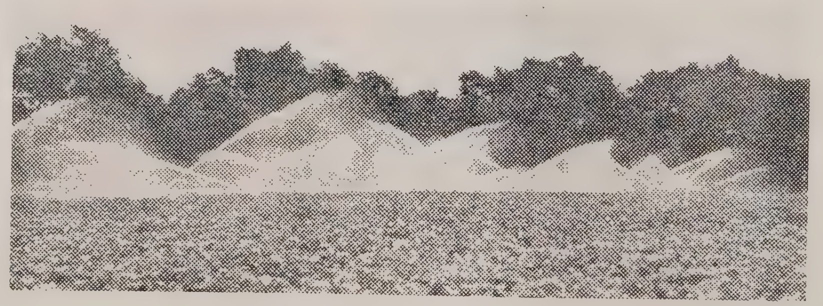

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Thinning of Peach Fruits

OF the many factors which influence the economic production of high-quality peaches of suitable size for both ordinary marketing and for cannery use, fruit thinning must be given a place of major importance in orchard operations. Chemical thinning of apples in the blossom stage shows promise, but there are considerable difficulties involved in applying this method to peaches. Because of the lack of experimental evidence that there is an efficient method of thinning peaches by the use of chemicals, hand thinning is the only method which can be recommended at present. In this article T. Conway, Horticultural Instructor, Department of Agriculture, Hastings, reviews the various points requiring consideration by orchardists and orchard workers to carry out thinning effectively.

[*National Publicity Studios photo.*

THE main reasons for thinning peaches should be appreciated by all who do this work and they are summarised as follows:—

1. Thinning provides a flexible means of establishing in any one season a proper balance between root and top growth to ensure that all fruits receive an adequate share of the available tree energy to develop to a good size.

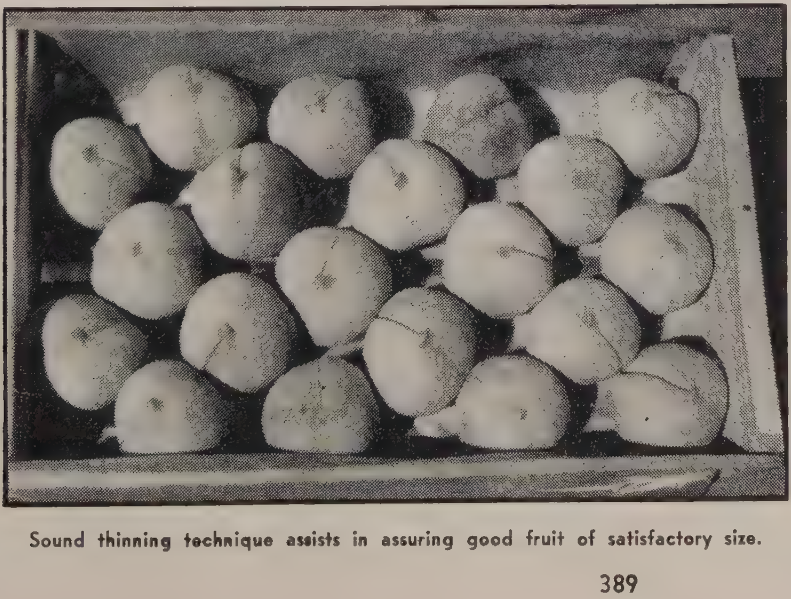
2. Thinning allows the removal of diseased, misshapen, or blemished fruit, thus improving the average quality and reducing handling costs.

3. Provision is made for a satisfactory balance between leaves and the fruits retained.

4. Distribution of fruits is regulated so that each part of the tree is not loaded beyond its capacity to carry well-grown crops.

5. Regular cropping is encouraged, as the tree is able to carry a satisfactory crop and at the same time produce ample new fruiting wood on which the following season's crop is borne.

6. Thinning has the effect of producing fruit of more uniform and higher average size than unthinned fruit. There is a special demand for peaches larger than average.



Sound thinning technique assists in assuring good fruit of satisfactory size.

7. Breakages of tree parts due to excessive weight of crop are reduced.

8. Disease and pest control is assisted, first, by the spaced fruit preventing spread by contact between fruits, and secondly by allowing better spray coverage of individual fruits.

Leafage per Fruit

It has been estimated that about 80 leaves per fruit are required for the best development and growth of peaches. The proportion of leaves to fruit on a tree is important. If a tree has a uniform setting on all its branches, each branch must be allowed to carry only as much fruit as its leaves can nourish to full size. When, however, a tree sets unevenly the higher proportion of leaves to fruit on one part may allow a slightly higher proportion of fruit to leaves on other parts.

Before thinning is begun it is necessary to ascertain whether the crop is evenly distributed or whether there are any parts without fruit or almost bare of fruit. When there is uneven distribution more fruit should be left on the stronger and more heavily loaded parts to leave as near as possible a full crop within the capacity of the tree as a whole.

Assessing Amount to Retain

The amount of fruit to retain on trees has always been a controversial

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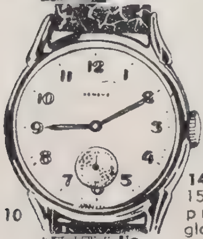
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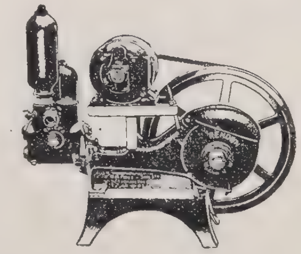

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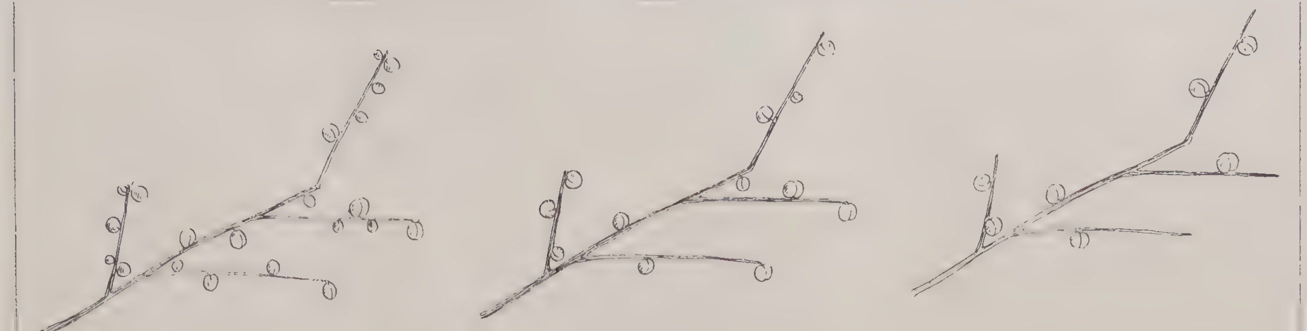

Thinning of peach fruits. Left—Untrimmed branch. Middle—System of thinning not recommended. Too many fruits have been retained and terminal fruits should have been discarded. Right—Good spacing and balance. Terminal fruits removed.

point. Recently this matter has received considerable attention by research workers overseas.

Investigations in the main canning-peach areas of Australia showed that a normal fruit set amounted to about 2000 fruits per tree and that if all these fruits reached the minimum canning size of 2⅜in. this quantity would represent 17 tons per acre. Although up to 50 per cent. of the fruits will drop before stone hardening takes place (that is, during the natural drop period), most of the trees will still carry considerably more fruits than it is possible to bring to satisfactory size at harvesting. Trials with Golden Queen indicated that even under good management conditions 750 fruits was about the maximum which a tree could carry and develop to good marketable size.

Points to Consider

Points to consider when thinning are:—

1. After the natural drop it is possible to note differences in the size of fruits on a tree. The fruit which is smaller than average at this stage is unlikely to catch up in size with the larger fruit at maturity. It is therefore wise to remove the smallest fruits.

2. A fruit of abnormal shape will retain this shape and will rarely grow to normal size.

3. Insect damage and other injuries will increase in size with the growth of the fruit.

4. With coloured varieties fruits growing in the shady parts of the tree will not colour as well as those exposed to the sun.

5. Fruits growing near the ends of laterals are usually smaller than those with leaf growth beyond them.

6. There is a tendency for weak or thin laterals to produce small fruit and strong branches or laterals to produce large fruit. Severe thinning of the fruits on weak laterals cannot be depended on to produce fruits of satisfactory size.

7. The stronger and healthier the fruiting wood the greater the quantity of fruit that can be left on it.

8. If the amount of thinning done to any part of the tree is varied with the thickness or the capacity of the wood to carry it, a slight improvement can be expected in the yield compared with regular-space thinning irrespective of type of wood. Regular-space thinning, therefore, is not important. If the fruit is distributed according to capacity and type of wood, the fruit size will be larger and more uniform. The aim, therefore, should be to spread the load fairly evenly over the tree according to the carrying capacity of each part.

9. The main concern when thinning should be the fruit which is left on the tree and not that which is on the ground when the job is completed. When a normal crop has set it is possible that if more than half the fruit is on the ground after thinning, a good job has been done.

10. A tree in relatively poor condition may set a heavy crop, but it cannot mature as much high-quality fruit as a stronger tree. In such cases heavy thinning is required. On the other hand when a strong tree has set a light crop very little thinning may be needed.

11. It will be found that there is a fairly quick development of peaches during the first 8 weeks or more after setting. As a result of inferior fertilisation two or perhaps three natural droppings may occur during this period. Normally the remaining fruit will be retained on the tree to maturity. Fruit thinning should be carried out at the conclusion of these natural drops.

When to Thin

To obtain good results from thinning it is necessary to complete the work as early as possible. A beginning is usually made once the fruit is large enough to handle after the completion of the natural spring drop and after late frosts. This is usually 6 to 10 weeks from blossoming or about the end of October to mid-November (when stone hardening is well established), but will vary with varieties or seasons. If this work is delayed until the fruits have reached a fair size, much of its value is lost.

If it appears later that the first thinning has been insufficient, perhaps in view of subsequent dry weather, a further light thinning may be found advisable to assure good fruit size.

Thinning Operation

Special snippers may be used for most types of fruit thinning. Thinning of peaches, however, is best done with the fingers, as the very short stems make the use of snippers impractical and unnecessary. No damage to spurs will occur with this method as it does with some other fruits.

Grasping the small peach between thumb and forefinger and giving the fruit a sharp twist sideways or against the direction of growth usually makes it part freely from the branch or lateral. With practice thinning can be done rapidly and with a smooth and steady motion, causing an almost continuous dropping of fruit.

Some varieties tend to thin themselves more readily than others and little additional thinning is required to bring the balance up to good marketable size, but this is not common.

With varieties which tend to bear much of their fruit toward the ends of the laterals, the terminal fruits should be removed first. All fruit which is blemished, abnormal in shape, or undersize should be removed. If a normal crop has set, there may still be too many left, and clusters of two or three fruits will require thinning to singles. Any further thinnings necessary should consist of reducing the number in the more shaded parts of the tree and those likely to be damaged in heavy winds. Even normal, well-placed fruits, may have to be removed to space and distribute satisfactorily the fruit allowed to remain.

One worker per tree is best for small to medium trees, but when the trees are large one worker may thin from the ground and one from a ladder. Three men can be used to advantage on very large trees, the third man being allotted the task of climbing into the centres of the trees to do the "inside" work. Such a worker should use rubber-soled shoes to prevent damage to trees.

Demonstration Trees

It is suggested that growers thin two or three trees as models and that workers employed on thinning should check with these trees from time to time to see that they are maintaining the correct standard. It is easy for workers to drift away from a standard unless an occasional check-back is made.

Success in thinning depends largely on good judgment of all factors involved. Sound thinning technique is only one part of peach production, and satisfactory yields, size, and quality of fruit depend on careful attention to all operations, especially in the early part of the season.

References

Various reports by G. J. Kidman, R. S. Harper, and C. E. Cole, all of the Department of Agriculture, Victoria, the Tatura Research Station, Victoria, and B. O. French, Department of Agriculture, Murrumbidgee Irrigation Area, Leeton.

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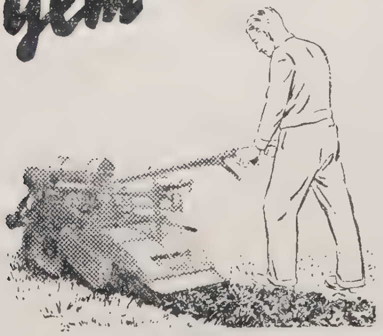

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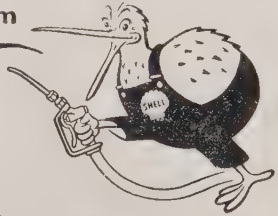

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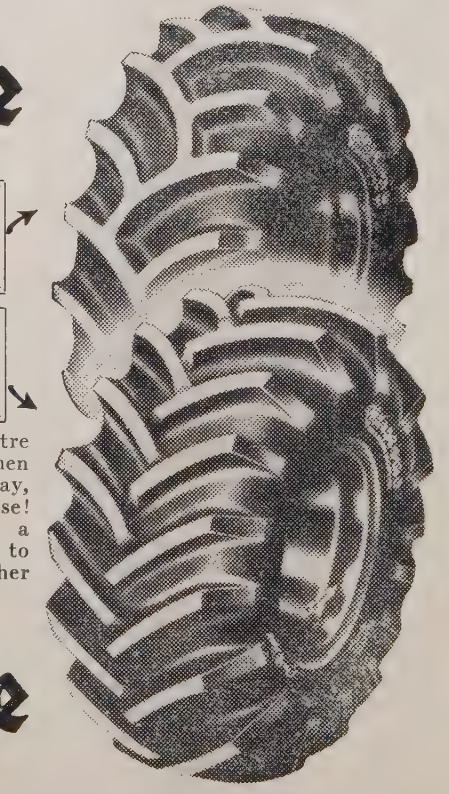

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Control of Disease Outbreaks on Poultry Farms

PREVIOUS articles in this series by J. J. Thompson, Veterinary Research Officer (Poultry), Department of Agriculture, Wellington, on the basis of disease prevention on the poultry farm appeared in the May, August, and September issues of the "Journal". In this, the concluding article of the series, he discusses control of disease outbreaks on poultry farms.

IN most diseases of poultry early recognition of the symptoms and the taking of prompt remedial measures are important. Early action will help to avoid the continual worry attached to tending a flock of sick birds. Nothing lowers the morale of the poultry farmer more than the feeling of dread that the morning inspection of the pens will reveal more dead or dying birds. The cost of delayed action can be not only loss of production but a flock in which loss of condition is so advanced that treatment is unlikely to be economical. Unfortunately the advisory officers of the Department of Agriculture are frequently called in at a late stage. The custom of seeking the help of more experienced poultry farmers and receiving a great variety of advice often leads to confusion and further delay. The fact that a man has been a commercial poultry farmer for many years does not guarantee that he knows any more about handling an outbreak of disease than another poultry farmer. The Poultry Instructor, by virtue of his training and field experience, backed by veterinary advice, is better fitted to help than a neighbouring poultry farmer. But remember to ask for help at an early stage and to supply all the details of feeding and management even though it means admitting mistakes.

How to Recognise an Outbreak

When half the flock are either dead or dying it does not require much thought or even a helpful neighbour to enable the worried flock owner to decide that things are not normal on his farm. But this type of outbreak is exceptional and most diseases can be detected in the early stage provided a reasonably careful inspection of the flock is carried out daily. With a little experience it is fairly easy to decide whether birds are in normal health and any departure from this state of health can then be recognised by the observant owner. Evidence of droopiness, lack of appetite, pale combs, discharge at the eyes and nose, drop in egg production, and leg weakness are all indications of a departure from normal health and should be regarded with suspicion. Abnormalities in young birds are detected also by the lack of spirit and liveliness, bedraggled appearance, leg weakness, and possibly an excessive number of deaths.

Diagnosis of the Condition

Most poultry diseases fall into one or more of four categories:—

Infectious conditions caused by bacteria, viruses, or fungi; for example, pullorum disease, fowl pox, and moniliasis.

Parasitic conditions due to the presence of internal or external parasites; for example, roundworms, coccidiosis, and red mite.

Errors of management including faulty housing conditions, overcrowding, and damp litter are predisposing causes of many diseases such as coccidiosis, colds, and chronic fowl cholera.

Nutritional errors or deficiencies arising from lack of protein, vitamins, or minerals in the diet are common causes of loss.

It is usually possible to establish which type of disease is present by investigation on the farm, and it is in this instance that the experience of the Poultry Instructor can be of great value to the poultry farmer. Even though it is necessary to seek laboratory help with post-mortem examinations, it is often found that changes in management, housing, or feeding will help to remove the predisposing causes or alleviate the condition.

Immediate Action to be Taken

Unless the condition is obviously due to faults in management, housing, or feeding, it is wise to assume in the early stages that the disease is infectious and act immediately. The initial steps to be taken in this case are:—

Seek Laboratory Aid

A number of diseased birds should be dispatched for laboratory examination. If possible, at least three live or dead birds should be sent. It is surprising how often the individual bird sent in for post-mortem examination is found to be suffering from a non-specific disease which is unrelated to the general condition of the rest of the flock. When a number of birds are sent the chance of accurate diagnosis being made is greatly increased.

It is usually better to send both live and dead birds from the affected pen to ensure success. Delay in diagnosis of the condition means lost time and delayed action in dealing with the spread of disease.

The information supplied to the laboratory with the specimens for examination can be of great value. A single bird accompanied by a note giving only the owner's name and address handicaps examination. A full history which includes details such as the size of flock, number of birds affected, housing and feeding conditions, the symptoms observed, and the period over which the birds appear to have been affected should be included. This information is of great assistance to the laboratory worker in forming his diagnosis; it also stimulates his interest in the case and enables him to give a more detailed report.

Remove and Destroy Badly Affected Birds

It is a mistake to attempt local treatment of a few birds in a pen and

A number of sudden deaths in a pen accompanied by evidence of illness in other birds is a danger signal pointing to the need for immediate action.

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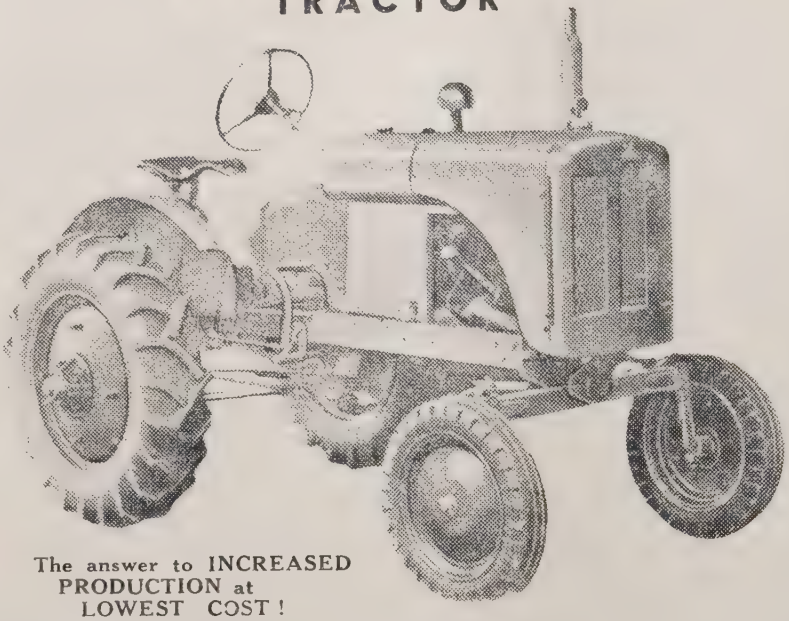

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expose the remainder to infection. The loss in many outbreaks of infections can be greatly reduced by radical culling of diseased birds in the early stage. This is particularly applicable to fowl pox, contagious catarrh or "roup", coccidiosis, fowl cholera, and pullorum disease.

Isolate all Sick Birds

Isolation is best carried out by removing the in-contact but apparently healthy birds to another empty pen or house, if available. Any feeding utensils or other equipment should be thoroughly cleaned and disinfected before being transferred to the new quarters.

Disposal of Diseased Birds

Every carcass of an affected bird must be burnt or buried. The large drum type of incinerator is often satisfactory, but if facilities for burning are not available, the birds should be buried deeply in a pit. A large pit with a tight-fitting lid is extremely useful for easy disposal of the normal losses, apart from the more urgent necessity of burying excessive numbers of diseased birds. The use of quicklime will hasten the decomposition of the carcasses.

Sanitary Measures

To prevent the spread of an infectious disease extra care must be taken in sanitary precautions. The water troughs should be emptied, cleaned, and disinfected daily in the suspected pens. Disinfectants or antiseptics in the drinking water are of little value and frequently tend to reduce the water consumption of the birds with bad results.

Food troughs should also be thoroughly cleaned and scalded daily.

Feeding

In any diseased condition of the birds feeding is important. Most diseases cause a loss of appetite and reduced feed consumption. Any change in feed in an attempt to increase consumption should never be made abruptly but should be carried out gradually over several days.

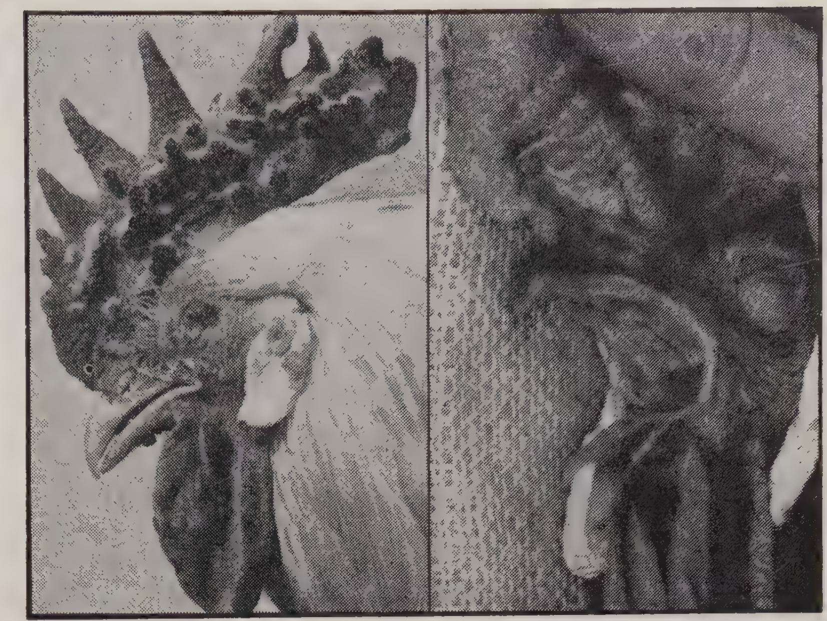
Milk or milk products, good greenfeed in plentiful supply, and molasses in the mash are useful additions to the diet of sick birds. Changing temporarily from dry to wet mash may induce sick birds to eat. These measures are especially of value in the convalescent period.

Disinfection Methods

Disinfection methods have already been described in a previous article in this series, but brief mention of the salient points is appropriate at this point.

Before the litter is removed and cleaning up is done, spraying the inside of the house with the disinfectant solution reduces the amount of dust, a useful precaution which prevents any infection being air-borne to other houses. The litter should then be removed and burnt or spread on land not used for poultry.

It is important to ensure that the birds do not have access to the manure from the infected sheds. The need for this precaution is well illustrated by recent experience on a poultry farm which suffered a sudden jump in the number of pullorum reactors from 2 per cent. at one blood test to 56 per cent. at the next. The sudden rise in the number of reactors was later traced to the birds having access to a poorly fenced heap of poultry manure removed from a shed in which the previous reactors in the flock had been kept for some time.



The visible signs of infectious diseases may vary greatly. Both birds shown are affected with fowl pox: The bird on the left is showing the comb form and the other bird is affected with the diphtheritic type involving the mouth and throat. Laboratory examination is often necessary to verify a field diagnosis.

Cleaning the house by scrubbing it down with a 5 per cent. solution of washing soda is the next step. Most disinfectants are of little value when used in the presence of dirt, and to allow them to act it is necessary to apply them to clean surfaces. Earth floors are naturally more difficult to deal with than concrete, but if the top layer of earth is scraped off and removed, and the surface heavily limed, the results should be satisfactory. Another method which may be applied in the limited area of a house is to spray the earth floor with a 5 to 10 per cent. solution of formalin and immediately cover it with sacks. This constitutes a form of fumigation.

Disinfectants

Any good reliable coal tar disinfectant used at the strength approved by the manufacturer should give adequate results. Creosote, despite its strong "healthy" odour, is a reliable wood preservative, not a disinfectant. The disinfectant should be thoroughly sprayed into every corner of the house. All the food troughs and drinking troughs should be treated thoroughly with the disinfectant solution after being scrubbed clean. The house should then be allowed to dry out before being put to use again.

Disinfection of Runs or Range

No disinfectant is available which is cheap or efficient to carry out sterilisation of soil or pasture. If diseased birds have been running on a patch of ground, the best method of cleaning it up is to keep it free of stock for as long as possible. By keeping the grass short and allowing the direct rays of the sun to penetrate through to the soil the run will eventually be free of infection. Usually at least 6 months to a year is required for efficient cleaning up of bacteria or parasites.

Ploughing up and heavy liming may sometimes be of value, especially if the ground is allowed to lie fallow for a period. Cropping the ground is of course another useful measure.

It must be remembered, however, that the success of any of these measures is dependent on the ground being kept free of poultry for a prolonged period.

Use of Drugs or Medicines

The advent of the sulphonamides has led to a notable advance in the treatment of a few diseases, but in general diseases of poultry do not respond greatly to the use of drugs.

Coccidiosis

Sulphaquinoxaline and sulphamethazine have both given excellent results in the treatment of caecal coccidiosis. The former drug has also shown promise in treating duodenal coccidiosis.

Colds and Contagious Catarrh

Sulphathiazole may be used in troublesome outbreaks of colds and contagious catarrh which spread through a pen of birds. Sometimes it gives excellent results; sometimes it does not. The result depends on the type of organism which is present in the birds.

Sulphaquinoxaline may also give useful results in some outbreaks.

Local applications which may alleviate the symptoms include

These chicks from their appearance could be suffering from coccidiosis, blackhead, protein deficiency, vitamin shortage, or possibly lack of certain minerals. The ability to differentiate these conditions requires experience and training. The chicks shown are affected by a form of vitamin E deficiency which is still being investigated under the title of X chick disease.

menthol or eucalyptus oil. A small amount sprayed on the birds at perching time helps to relieve the birds and may assist in clearing up the condition.

Acute and Chronic Fowl Cholera

Sulphaquinoxaline has been usefully employed in the treatment of fowl cholera, but it is of value only if used at a very early stage in the outbreak.

It is a common practice to medicate the drinking water during outbreaks of colds and other forms of "roup" such as contagious catarrh and chronic fowl cholera. This is probably of little value. Permanganate of potash, which is normally used, quickly loses its antiseptic qualities when added to the drinking water, and if too much is added or medication is continued too long, the fowls' digestions may be seriously upset. If treatment of the drinking water is considered desirable, the chlorine type of antiseptic such as the hypochlorites or one of the quaternary ammonium compounds will give better results.

Pullet Disease

Many remedies and drugs have been tried out as a method of treatment of pullet disease, and it has been reported that a number of antibiotics, especially aureomycin and terramycin, have given excellent results when given in feed or water.

More simple treatments have also met with a good response and the one most commonly used is dosing with Epsom-salt at the level of 1lb. in 2 gallons of water for each 100 birds, followed by the use of 3 per cent. of molasses in the drinking water or up to 15 per cent. in the feed. Potash and potassium chloride in the feed or water have also given good results. It is added to the drinking water to make 0.5 per cent. solution and used for 7 days. This may be followed up by adding it to the mash at the rate of 1.5 per cent. for a further 7 days, if necessary.

Roundworms

The use of carbon tetrachloride as a deworming agent is well known. Many other drugs have been tried out, but their efficiency and safety are much lower than those of carbon tetrachloride. It is best administered to the birds after withholding food for 18 to 24 hours.

Blackhead does not affect poultry as severely as it does turkeys, but a number of outbreaks have been encountered in several districts in chickens of 5 to 12 weeks of age which have occasioned severe loss of condition and a number of deaths. A new drug is now available under the trade name of "Entramin" which has specific curative properties when mixed with the mash. This chemical, 2-amino-5-nitrothiazole, which was originally introduced in the United States under the name of "Enheptin T", is used as a pre-mix powder and should be noted as another useful addition to the number of drugs which are specific for a particular condition in poultry.

External Parasites

Many insecticides containing benzene hexachloride or D.D.T. or a mixture of both are available and will give satisfactory results if properly used. Nicotine sulphate is also extensively used as a perch paint.

Although some of the drugs mentioned are of specific value, it must again be emphasised that prompt recognition of the disease symptoms and application of the drug are essential if reasonably good results are to be expected. The use of tonics for birds which are not thriving is wasteful and merely obscures diagnosis of the fault in management or feeding which has given rise to the condition.

Recommendations

In brief, the measures to be taken in the event of a suspected outbreak of disease are:—

1. Isolate the affected and in-contact birds from the remainder of the flock as far as possible.

2. Take immediate steps to identify the disease.

3. If the disease appears to be infectious, institute a programme of rigid sanitation.

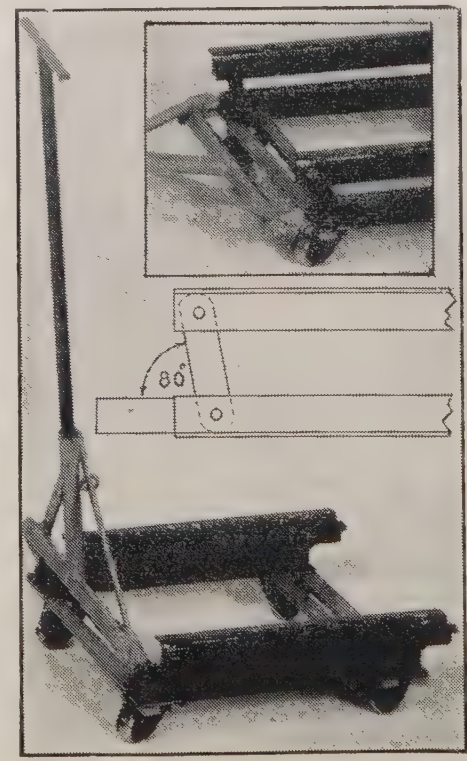
4. Make any adjustment of conditions of management, housing, or feeding, etc., which may have been responsible.

5. Act promptly to cull severely affected birds, which will spread the disease to others.

6. If any specific drug is available, such as the sulphonamides for coccidiosis, apply the treatment as soon as possible.

7. Consult the Poultry Instructor or Veterinarian at the local office of the Department of Agriculture for help and advice.

Improvement in Design of Honey-house Bogey



THE design of the honey-house bogey described in the July issue of the "Journal" (page 61) can be improved by altering the angle of the lifting arms, one of which is illustrated (see also original diagrams), from 90 degrees to about 80 degrees.

It has been found that with the bogey design given in the July "Journal" there is a tendency for the lifting arms, which are perpendicular when the platform is raised, to drop back to the lowered position if loading is done when the top platform is raised or when the bogey is standing loaded ready for removal. This brings the handle up quickly with considerable force, which can be dangerous. If the angle of the lifting arms is altered so that in the raised position they rest past the perpendicular, at 80 degrees, there is no risk of the arms slipping and the top of the bogey is held in the raised position when the lifting handle is down.

Any simple locking device that would not impede the efficiency of the bogey would also overcome the tendency for the locking arms to drop back.

Queen Excluders and Their Use in Apiary Management

QUEEN excluders were originally designed as a means of confining the queen bee to a particular portion of a hive. However, over the years beekeepers have found that this piece of apiary equipment can be put to many uses in routine apiary management and that with it much valuable time can be saved during busy summer months. In this article C. R. Paterson, Apiculturist, Department of Agriculture, Hamilton, describes the uses to which queen excluders may be adapted.

THE three kinds of bees found in a normal hive, queen, drones, and workers, vary considerably in size. The largest of the three is the drone; the queen is next, but her body is only slightly bigger than that of the worker. Any appliance therefore that is to be used to confine the queen to a section of the hive will also restrict the movement of all drones in that section. This is a point that is often lost sight of, and it is not uncommon to find an excluder completely blocked with drones making a desperate effort to force their way through the excluder. This is not desirable, as bees above such an excluder could easily suffocate in warm weather.

It was possible to evolve a queen excluder because the queen is just slightly larger than a worker. Unfortunately the difference is not very great, so care has to be taken in the manufacture of any satisfactory excluder. Care also has to be exercised by the beekeeper in handling; otherwise the openings become distorted and the usefulness of the excluder is destroyed. As the drones are the bulkiest inmates of the hive, a queen excluder also becomes a drone excluder. This fact should not be forgotten when using an excluder in certain hive manipulations.

There are several types of queen excluder on the market. The first was a sheet of zinc with openings of a regular size stamped out all over it. To retain stability in the sheet only a limited number of openings could be made. It was found, however, that these excluders had sharp edges left on the under side after going through the press machine and that bees were rather loath to push their way through sharp-edged openings. In addition to this serious drawback some zinc excluders came on the market with the openings too small. Many earlier commercial beekeepers after purchasing large numbers of these excluders found them far from satisfactory, and for many years the use of queen excluders was discouraged in apiary management.

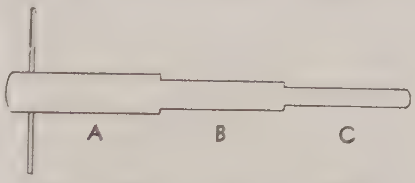
Waldron: The Waldron excluder is built up of steel wire and the spacing is controlled by several cross members which also give the excluder stability. This unit is then set into a narrow wooden frame which not only protects the wire but keeps it up off the frames, thus providing a bee space over the top bars of the frames. In theory this is very good, but it has been found in practice that the bees are inclined to fill the space with wax.

Chrysler: The latest excluder on the market is the Chrysler, which is an all-steel one. The wires are held rigidly in place by cross stays 1¼in. apart. The excluder is bound at the outer edges in a flat steel frame electrically welded throughout. This excluder lies flat on the frames in the same way as the zinc ones do.

All excluders should have openings of standard width for the passage of worker bees only, and if there is doubt of the reliability of any excluder, the spacing can be checked by a metal gauge which has three sizes on it for convenience and accurate checking: Too small, approximately correct, and too large. Any machine shop with a micrometer gauge would supply what is required. The sketch on this page describes the gauge and gives the measurements required.

Main Use

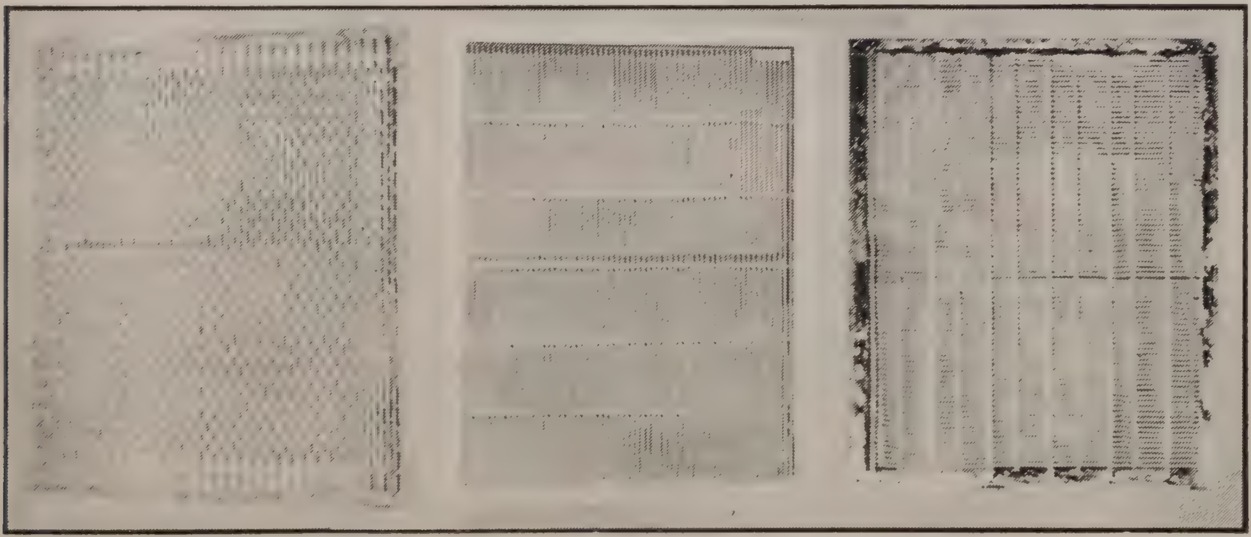
As the hive builds up in bee strength during spring eventually about 50 to 70 thousand bees populate the hive. It is then a problem to locate the queen among this force of bees. The queen excluder therefore plays a very important part by confining the queen to a portion of the hive. This is of considerable importance to the commercial beekeeper when he wishes to carry out certain manipulations, as he knows immediately in which portion of the hive the queen may be found.



Testing gauge for queen excluders. A—Too large (.165in.). B—Correct (.163in.). C—Too small (.161in.).

A sound spring apiary management can therefore be put into practice by use of the excluder. In the South Island the main aim generally is to give the queen unlimited scope to build up to maximum strength. In this case an excluder is not used until near the beginning of the main honey flow, when the queen can be confined to the bottom super and be provided with a few empty combs in which to extend her egg laying.

In the earlier districts of the North Island it is sometimes desirable to con-



Three types of queen excluder. Left—Zinc excluder. Some have the slots running the other way. Middle—Waldron excluder. Right—Chrysler all-metal excluder.

fine the queen to a single super for a period in an endeavour to keep the hive from reaching maximum strength too soon. This shows how the excluder is used at different times in various districts with the one object in view; that is, production of bees at the right time capable of bringing in a satisfactory crop.

Many manipulations of the hive are made possible by the excluder, such as the following:—

Demaree Swarm Control

The Demaree method of swarm control has been practised by beekeepers for many years. However, beekeepers are now applying it in so many modified forms that it is perhaps true to say that only a few beekeepers are carrying out the original manipulation as set out by Demaree. It is not the purpose of this article to explain the method fully, but a brief outline will be given to show the important part the excluder plays in it. This is a swarm control measure, so it is naturally practised on a hive full of bees and occupying at least two supers. The principle underlying the Demaree method is to place the queen with about 2 to 3 frames of brood in the bottom box, the rest of the space being filled with honey and pollen and a supply of empty combs. Sometimes foundation can be used to advantage instead of empty combs. The queen excluder is then placed on top and a super of empty combs placed above. Above this again is placed the super of remaining brood, which should be checked over after 5 or 6 days for any queen cells. Good brood combs are desirable; otherwise excessive drones will soon reduce the efficiency of the excluder.

Making Divisions or Nuclei

Queen excluders are most useful for making increase by dividing a hive just before the honey flow. If such a move is contemplated, extra equipment requires to be made up, and at the same time consideration has to be given as to where the new queens are to come from. They may be purchased or cells raised by the beekeeper himself. Whichever method is adopted, however, there is always the possibility that the queens will arrive or the cells be ready during a spell of very stormy weather. It is very disconcerting to have to manipulate hives and look for a queen under such conditions. Much of this could be avoided if several days before arrival date of the queens or maturity of prepared cells, the queen in the hive selected for division is placed below an excluder with about an equal amount of brood above and below. It is not even necessary to hunt for the queen, but just to make sure that all the bees are shaken off every comb that is to go above the excluder. This could be about 5 or 6 frames of mostly capped brood and the balance pollen and honey. After all the bees have been shaken into the lower box, place the excluder on top and put on the super with the shaken combs. The queen is now down below the excluder and nurse bees will soon come through to attend to the brood above. It is surprising how quickly 20 or 30 hives can be done in this manner. The beekeeper can now be assured that no matter how rough the weather may be when the queens arrive, it is going to be a simple matter to lift away the super above the excluder and place it on a new stand, preferably another location several miles away. The new queen in her travelling cage or a ripe queen cell can be quickly placed in an appropriate position in the new division. Many queens and cells have been lost because the precautions outlined against a spell of bad weather have not been taken.

For those wishing to make up a number of nuclei the method given can be used to advantage, the only difference being that the super above the excluder should be filled with frames of capped brood. It may be necessary to secure brood from other hives for this purpose. A few days after, when the cells are ready, it is a very quick job to go to these prepared supers and take out two frames of brood and adhering young bees and place them in the nucleus hive, with the required amount of honey and pollen, at the same time placing a cell just above the brood. By this method nuclei can be made up very quickly even in the worst weather. The beekeeper has the assurance at the same time that they are stocked with a large proportion of young bees which are not likely to return to the parent hive.

Requeening

The excluder will be found very useful when the old queen in a hive has to be replaced with a new one, especially if the hive is still strong and the bees are inclined to be of a rather dark strain. Considerable time can be spent hunting for a queen through several supers, whereas if excluders had been placed between each super several days earlier, the beekeeper would be able to confine his attention to the super that had newly laid eggs in the cells.

Keeping Queen out of Extracting Combs

The main use of the excluder is when the honey flow is on and it is essential for the beekeeper to make sure the queen does not have access to the combs where the surplus honey is going to be stored. Many beekeepers see no use for the excluder at this period of the season because they handle each comb of honey individually. Any that have brood are replaced in the hive. To those beekeepers who rely on the escape boards for removing their crop, and it is generally considered that this is the most satisfactory way because it is quick and keeps robbing down to a minimum, it is essential that no brood be up among the honey. This is, of course, looked after by the excluder. Many have made the statement that a queen excluder reduces the crop because it requires more effort from the bees to scramble through the openings. Experience has shown that this is not the case.

Keeping Queen from Poor Combs

There are unfortunately some beekeepers who have let their combs deteriorate to such an extent that it would be almost impossible for them to be used without an excluder. However, there are odd times in the best organised apiary where the excluder can be used for this purpose.

Conclusions

1. The queen excluder correctly used plays an important part in commercial honey production.

2. Make sure the type being used gives the correct bee space.

3. When combs with excessive drone brood are placed above an excluder some arrangements should be made to prevent them from clogging up the excluder. This can be done by lifting the super at one end by means of a small stick or wedge.

4. An excluder can be 100 per cent. effective only if it is free from adhering burr comb and thoroughly clean.

5. Always handle excluders with care, especially when removing them from hives.

6. Queen excluders represent a considerable capital outlay, so store them away carefully when not in use.

Radio Broadcasts

RADIO broadcasts to farmers will be given in December as follows:—

1YA Auckland, 7.15 p.m.

3 December—"Fruit for Shows", by L. R. Renouf, Horticultural Instructor, Department of Agriculture, Auckland.

10 December—"Lessons from the Past Year", by E. H. Arnold, Assistant Fields Superintendent, Department of Agriculture, Auckland.

1YZ Rotorua, 7.15 p.m.

11 December—"Work for the Coming Month", by G. A. Blake, Instructor in Agriculture, Department of Agriculture, Matamata.

2YZ Napier, 7. p.m.

9 December—"General Quality Faults and Their Remedies", by J. A. Power, Farm Dairy Instructor, Department of Agriculture, Waipawa.

23 December—"Harvesting Cereal Crops", by F. H. Collin, Fields Instructor, Department of Agriculture, Hastings.

2XA Wanganui, 8 p.m.

4 December—Country Women's Session.

11 December—"General Maintenance and Disease and Pest Control in the Vegetable Garden", by H. P. Thomas, Horticultural Instructor, Department of Agriculture, Wanganui.

2ZA Palmerston North, 12.30 p.m.

1 December—"Meat Inspection", by J. W. Turnbull, Meat Inspector, Department of Agriculture, Palmerston North.

8 December—"Pasture Establishment—the Grass to Grass Method", by J. M. Hopkins, Instructor in Agriculture, Department of Agriculture, Levin.

15 December—"Pitfalls in Beekeeping", by L. H. Johnson, Apiary Instructor, Department of Agriculture, Palmerston North.

22 December—"Hygiene in the Milking Shed", by A. T. Gabolinscy, Special Inspector, Department of Agriculture, Hamilton.

29 December—Y.F.C. session, by I. G. Tabor.

3YA Christchurch

11 December (7.15 p.m.)—Review of "The New Zealand Journal of Agriculture", by E. G. Smith, Fields Instructor, Department of Agriculture, Rangiora.

29 December (12.20 p.m.)—"The Farming Year", by A. R. Dingwall, Assistant Fields Superintendent, Department of Agriculture, Christchurch.

Other Broadcasts

1YA Auckland, Tuesdays at 12.35 p.m. and Wednesdays at 7.15 p.m.; 1YD Auckland, Thursdays at 7.30 p.m.; 1XN Whangarei, Mondays and Wednesdays at 8.10 p.m.; 2XA Wanganui, Thursdays at 8 p.m.; 2XG Gisborne, Tuesdays at 8 p.m.; 3XC Timaru, Wednesdays at 8.5 p.m.

Mechanical Cutting of Hawthorn Fences

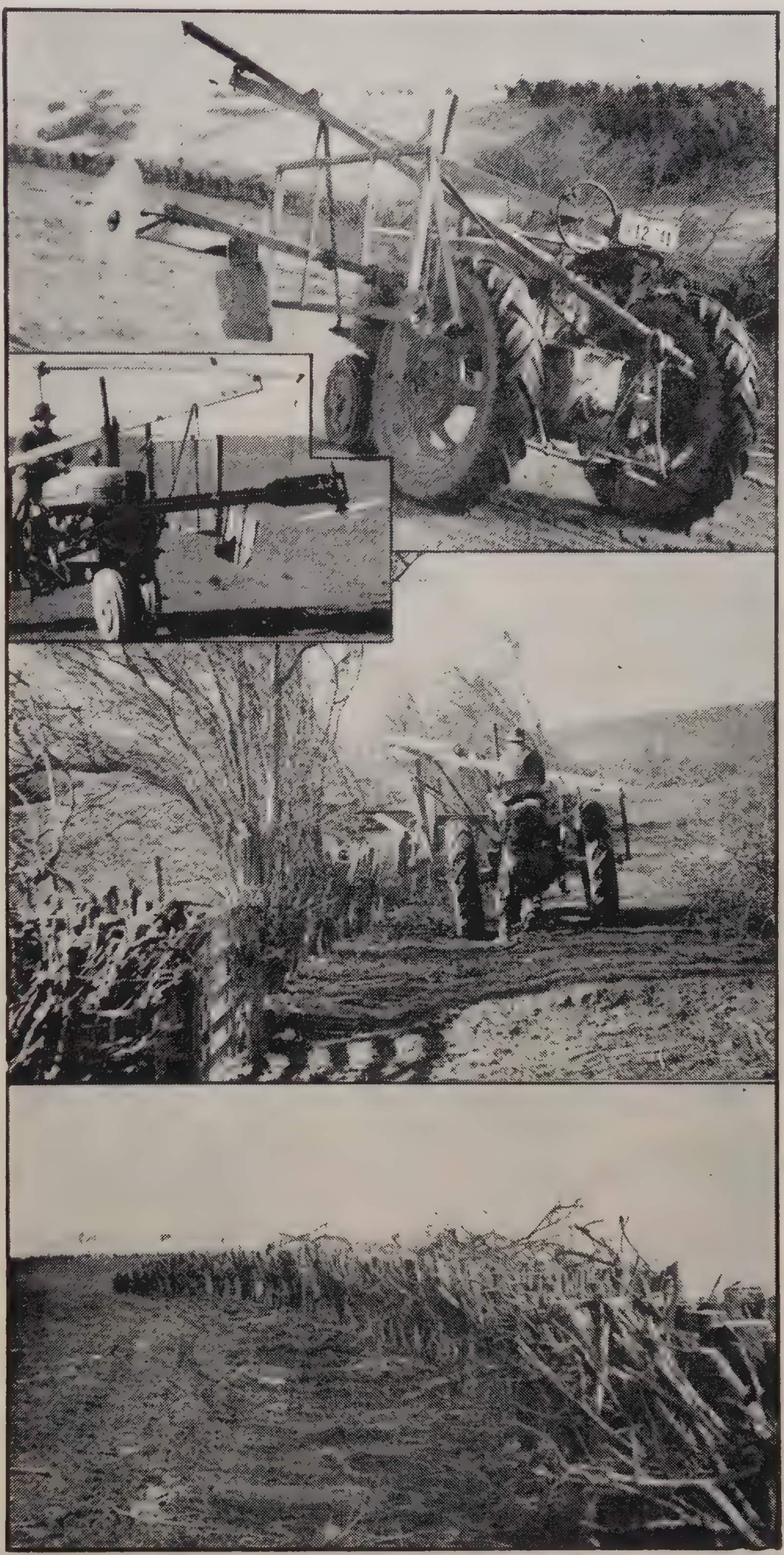
CUTTING tall, overgrown hawthorn fences by hand is always a problem, especially in times of labour shortage or high wages. Mechanical cutting is a solution, and in this article J. D. Wraight, Fields Instructor, Department of Agriculture, Timaru, describes the method used to convert a gorse-cutting machine to handle tall hawthorn by a South Canterbury farmer who acquired a farm where many of the fences were of overgrown hawthorn.

THE main alteration involves the mounting of a cross-cut, circular saw 42in. in diameter to the shaft which normally carries the arms and cutting knives of a conventional gorse-cutter. Two face plates 6 to 8in. in diameter placed one on either side of the blade are required. The outside plate should be relatively thin or it will impede the progress of the saw among cut material. The saw is driven at maximum belt-pulley speed.

When hedges that have made 10 to 15ft. of growth are being cut the first cut is made with the saw set horizontally to remove all tall and overhanging branches before the sides are trimmed. With the tractor travelling in low gear at a normal forward speed the high periphery speed of the blade enables the machine to handle timber up to 6in. in diameter and at the same time maintain a satisfactory rate of cutting without the saw having to be frequently released. As a higher saw speed and slower forward motion are required for cutting thicker timber, heavier branches can be dealt with by using a second tractor to tow the first, the engine of which can then be used solely for powering the saw and can therefore be run fast enough to give the high saw speed necessary.

All tall branches are not severed by one cutting. and several cuts are required to reduce the fence to suitable dimensions. the number of cuts depending on the amount of material and the width of the hedge. The first horizontal cut should be made lower than the desired finished height of the fence. Subsequent cuts can then be made slightly higher each time, thus allowing the saw to run free. Once the tall and overhanging branches are disposed of the saw is set vertically and the sides of the hedge are trimmed in the normal way.

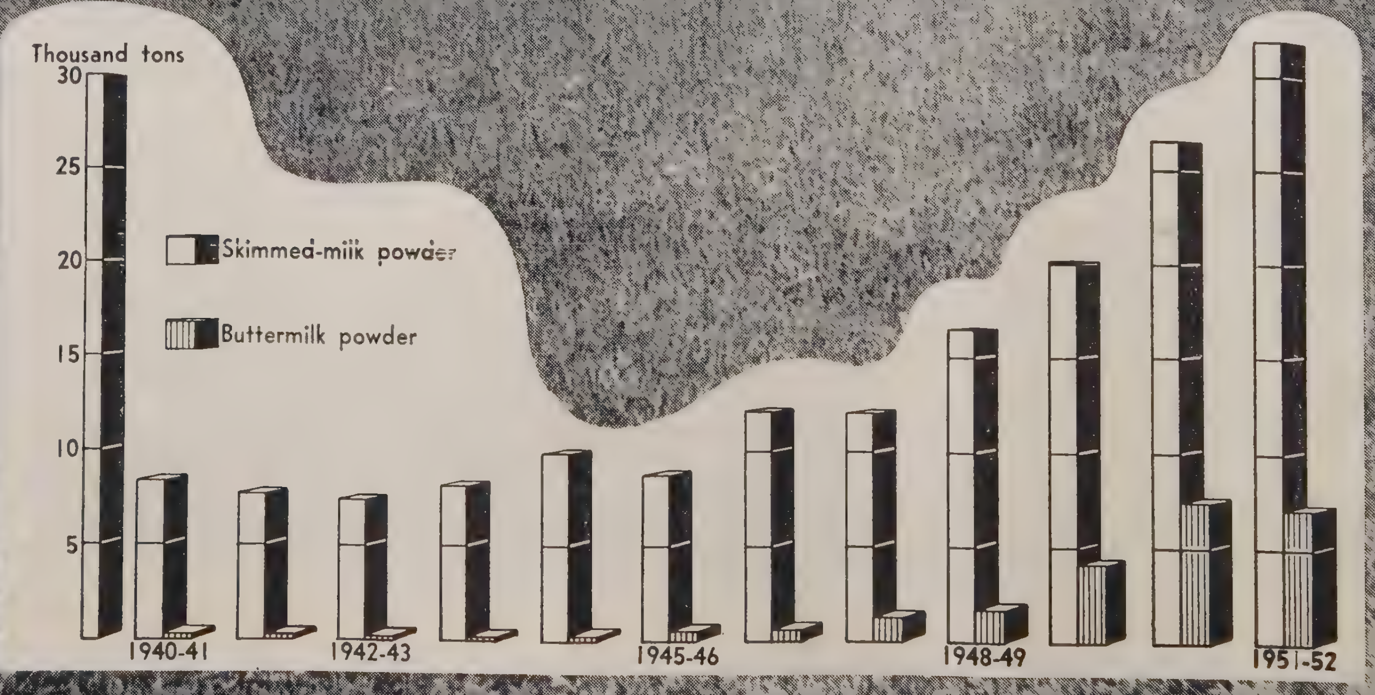
Fences cut back 2 years ago on the farm described were trimmed again last season and it was easy to run along them with the machine. Now that the fences are in good condition they are more stockproof than before and will offer no difficulties in future cutting.



At right—Upper: Tractor-attached gorse-cutter with the circular saw mounted vertically in place of the arms and cutting knives. Inset shows the saw mounted in the horizontal position. Middle: The first horizontal cut, showing the size of material the machine is capable of handling. Lower: The fence after the cutting has been completed.

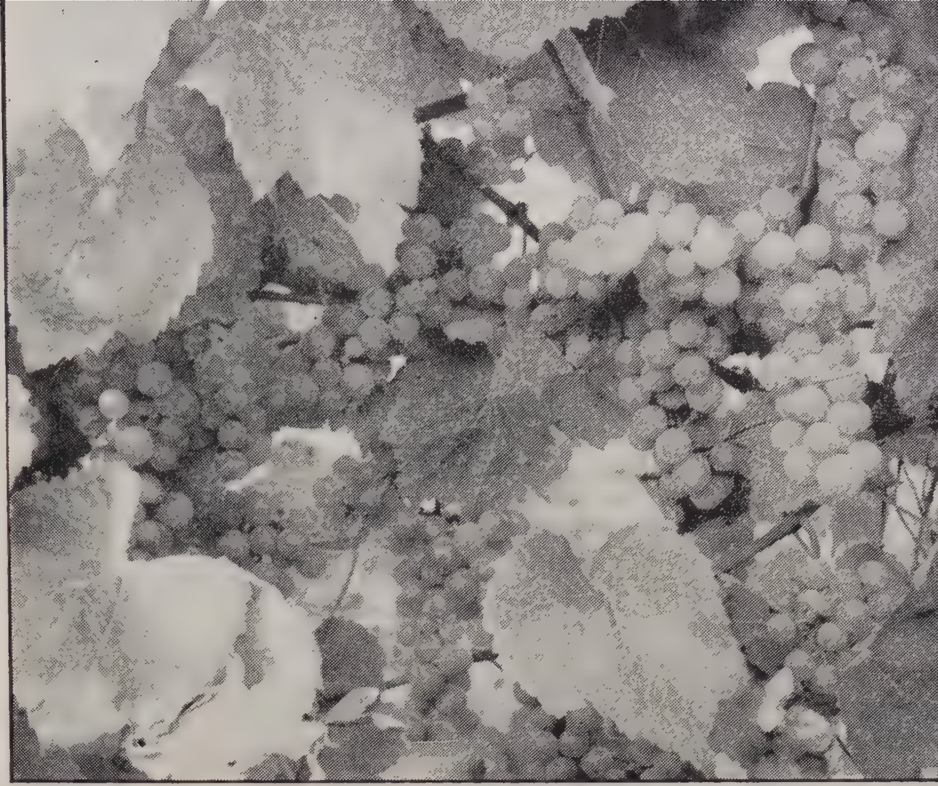
SUBSTANTIAL RISE IN MILK POWDER PRODUCTION

An important trend in the dairy industry in recent years is the remarkable increase in the production of milk powders. In 1940-41 the quantity of skimmed-milk powder produced was about 8300 tons and buttermilk powder about 300 tons, but last season the output of skimmed-milk powder had risen to 31,800 tons and that of buttermilk powder to 7069 tons. In addition the production of wholemilk powder and blended powders has expanded considerably and is likely to increase still further. The graph below, which is based on data supplied by the Statistical Section, Extension Division, Department of Agriculture, Wellington, shows the rise in production of skimmed-milk powder and buttermilk powder between 1940-41 and 1951-52.



Grape Growing in the Home Garden

By F. BERRY-SMITH, Viticulturist,
Department of Agriculture, Auckland



THE grape vine can be grown successfully in many parts of New Zealand, provided it is planted in a sunny, sheltered position which is free from spring frosts. Because of New Zealand's cool climate, selection of vines for outdoor planting is limited to early-maturing varieties. The first section of this article on grape growing in the home garden deals with establishment, training, and pruning; the concluding section, which will appear next month, will discuss trellising, manuring, cultivation, and control of pests and diseases.

SOIL conditions for vines are not very exacting and provided drainage is good, vines will grow successfully in a wide range of soil types, though the ideal is a sandy loam. Very fertile soil rich in humus is not ideal for grape culture, because it induces excessive growth of foliage and little fruit. Such a soil should be depleted in fertility by growing other crops for a time without manure before vines are established. The other extreme is the heavy clay type of soil which has poor drainage and lacks fertility. This type of soil should be opened up to a depth of 12in. in autumn, limed at the rate of 1lb. per square yard, allowed to lie fallow over winter, and cultivated in early August, a liberal application of blood and bone manure and compost if available being dug in.

The hole for planting a vine should be made about 2ft. wide by 1ft. deep. It should be filled in to a depth of 6in. with good topsoil and old bones, if available, and the vine roots set on this and the hole filled in with more topsoil. Soil should be pressed firmly around the roots. If only one vine is to be planted on poor soil, the most satisfactory procedure is to remove the soil to a depth of 12in. over an area of about 6ft. x 6ft. and replace it with fertile topsoil. Before the hole is filled the subsoil should be broken up. In normally fertile, well-drained soils no such special preparation for planting is necessary. It is important, however, not to exceed a depth of 6in. when planting. Deeper planting places the roots in the cold, infertile subsoil and the vine will languish.

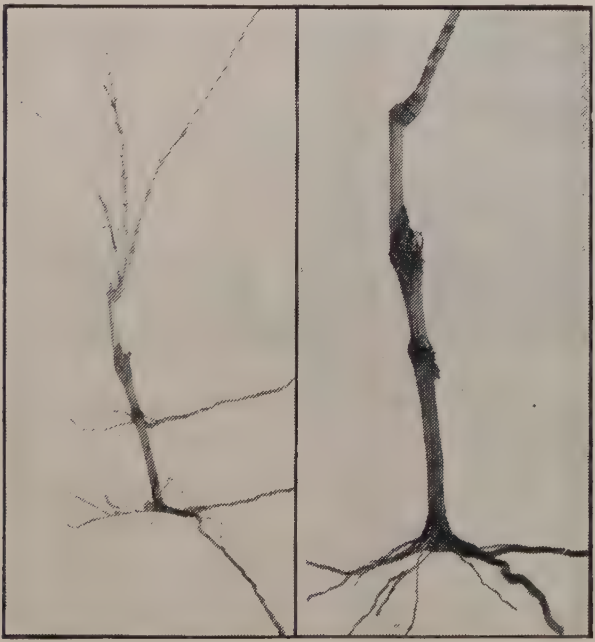


Fig. 1 (left)—Unpruned nursery vine. Fig. 2 (right)—Same vine prepared for planting.

Varieties

Because of New Zealand's cool climate a big percentage of the grape varieties grown successfully in other countries are unsuitable here because of their late-maturing habit.

The following varieties are recommended for outdoor culture in New Zealand:—

Black grapes: Alphonse Lavallee, Dolcetto, Muscat Hamburgh, Black Hamburgh, Albany Surprise, Seibel 4643, Seibel 5455.

Pink grapes: Chasselas Rose Salomon, Chasselas Rose Royale, Ferdinand de Lesseps, Plovak, Iona.

White grapes: Madeleine Royale, Madeleine Alice Salomon, Golden Chasselas, Diamond, Cannon Hall Muscat, Dr. Hogg Muscat, Dattier de Beyrouth, Muscat de Frontignan, Muscat de Terricina, Chasselas Persille, Riesling Sylvaner.

A detailed description of these varieties, including information on fruiting and stock varieties, is given in the Department of Agriculture Bulletin No. 354 "Viticulture", which is available at 2s. 6d. from main offices of the Department.

For the home gardener interested only in hardy varieties which do not demand much attention, Albany Surprise, Seibel 4643, Seibel 5455, Iona, and Diamond are most suitable. Cuttings of these varieties may be purchased from the Te Kauwhata Horticultural Station on application to the manager. Rooted vines are not available from the Te Kauwhata Station, but are obtainable from nurserymen or plant distributors.

Planting

Vines strike easily from cuttings and do well on their own roots if not attacked by phylloxera. In all areas north of and including Tauranga it is advisable to plant only vines which have been grafted on to phylloxera-resistant rootstock. Phylloxera is a minute insect which destroys the roots of ungrafted vines. All areas south of

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Tauranga are free from infestation by the phylloxera insect to date. The Grape-vine Diseases Regulations 1952 are designed to prevent the spread of phylloxera. Under these regulations it is an offence to send vines from any place north of and including Tauranga to places south of Tauranga unless they have been sterilised under the supervision of a Horticultural Inspector of the Department of Agriculture and a certificate of treatment has been issued.

The best time to plant cuttings is August. Cuttings are made about 8in. long for planting and buried to a depth such that only one bud is exposed and this is lightly covered with soil to suppress movement until roots start to develop. The strike from cuttings is improved if the wood is soaked in water for a day before planting.

Pruning before Planting

When vines are received from a nurseryman they require pruning before planting. Pruning at this stage is simple. All roots except the bottom set are cut off and the latter are pruned back to 3 or 4in. The strongest shoot is pruned back to two buds and others completely removed with the secateurs. The vine is planted so that the grafted joint is just above ground level and the earth mounded up to the top bud. This prevents drying out of the vine until root action begins or, on the other hand, should wet weather occur, excess water is diverted. Once the vine is growing actively the soil mounded round the vine is levelled off (see Figs. 1 to 5 on planting procedure).

It is important not to place the grafted joint below ground level, because if this is done, roots will develop above the graft and the rootstock eventually will die. Even with the graft just above ground level there is a likelihood of the graft being covered with soil at some time or other from cultivation, and occasional attention may be necessary to remove any scion roots. Routine attention must also be given to cutting out suckers from the rootstock.

Training and Pruning

Fig. 6 shows the sequence of pruning and training of a vine from time of planting to a fully developed spur-pruned vine 5 or 6 years later.

1A—Newly planted vine is pruned back to two buds.

2A—First season's growth: The foliage is tied to a stake to keep it off the ground and protect it from wind damage. Unless the vine is secured in this way, wind is likely to loosen it in the ground and form an opening to water around the stem, which may cause rot.

Growth should not be checked in any way the first season, as the object is to encourage a strong root system. Any check to the growth will retard root development, for as the roots feed the foliage so also does the foliage feed and develop the roots. Spraying, which will be discussed in the second part of this article, should be attended to from the outset to maintain healthy growth. If any bunches are formed the first or second season, they should be removed, as cropping in the early stages of development drains the vitality of the vine.

1B—Second year's pruning: The strongest shoot is pruned back to two buds and all other growth cut off with the secateurs. Although the vine now appears similar to when first planted, a much stronger root system belies its apparent lack of progress.

2B—Second season's growth: Growth is tied to the stake as for the first season. The shoot which will make the straightest trunk for the vine is selected and pinched off the top about 4in. below the bottom wire of the trellis. A new leader with short spaces (or internodes) between the buds will proceed from the break; the close spacing of the buds permits the formation of the two permanent arms from approximately the same level.

1C—Third year's pruning: All wood except the shortened cane selected to form the trunk is removed. This single upright cane is cut back just below the bottom wire and tied to the stake.

2C—Third season's growth: The shoots proceeding from the top two buds are trained one on either side of the trunk along the bottom wire as

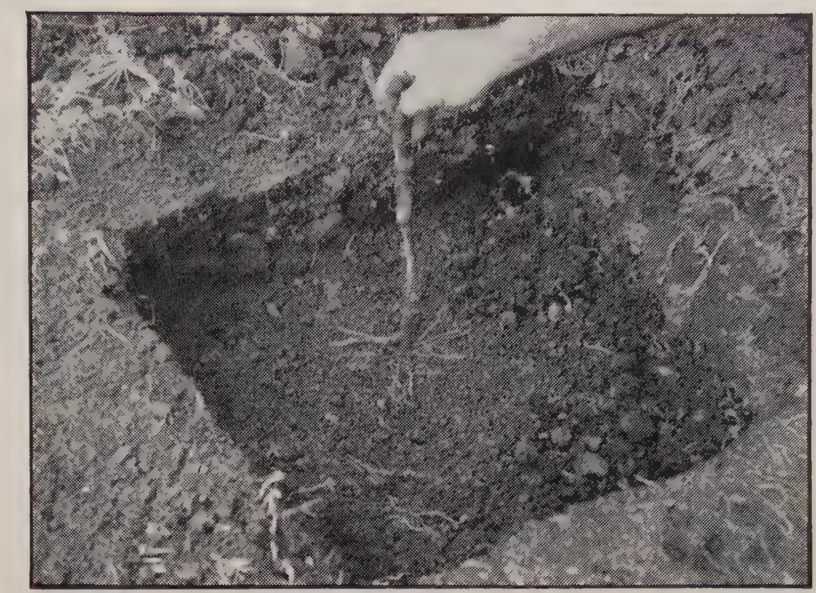

Fig. 3—Placing vine in hole.

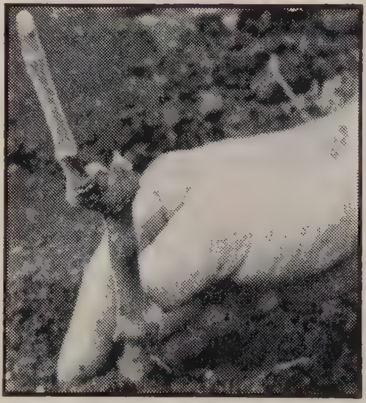

Fig. 4—Vine planted. Note grafted joint above ground level.

Fig. 5—Vine mounded over, the final planting operation.

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illustrated. All other growth is disbudded (rubbed off as it appears). In this way all the energy of the vine is directed into the development of the permanent structure of the vine, and the buds to form the spurs will be well spaced.

When these two top shoots have made about 4ft. of growth the tips are pinched off. This strengthens the wood and increases the fertility of the buds formed up to this juncture.

It is possible that each shoot will bear one or two bunches, which may be left to mature, as the vine will now be strong enough to support this.

1D—Fourth year's pruning: A cane of 3 or 4ft., the length depending on the vigour of the vine, is left on either side. Both canes should be pruned back to a bud on the under side. These buds will provide shoots the next season for further extension of the arms. It is easier and neater to bring a shoot from beneath the cane on to the bottom wire than one from a top bud.

2D—Fourth season's growth: From the wood laid down at the previous pruning the vine should produce about 15lb. of grapes. The vine always bears on wood formed the previous season. Training consists of carefully and gently tying the shoots from the

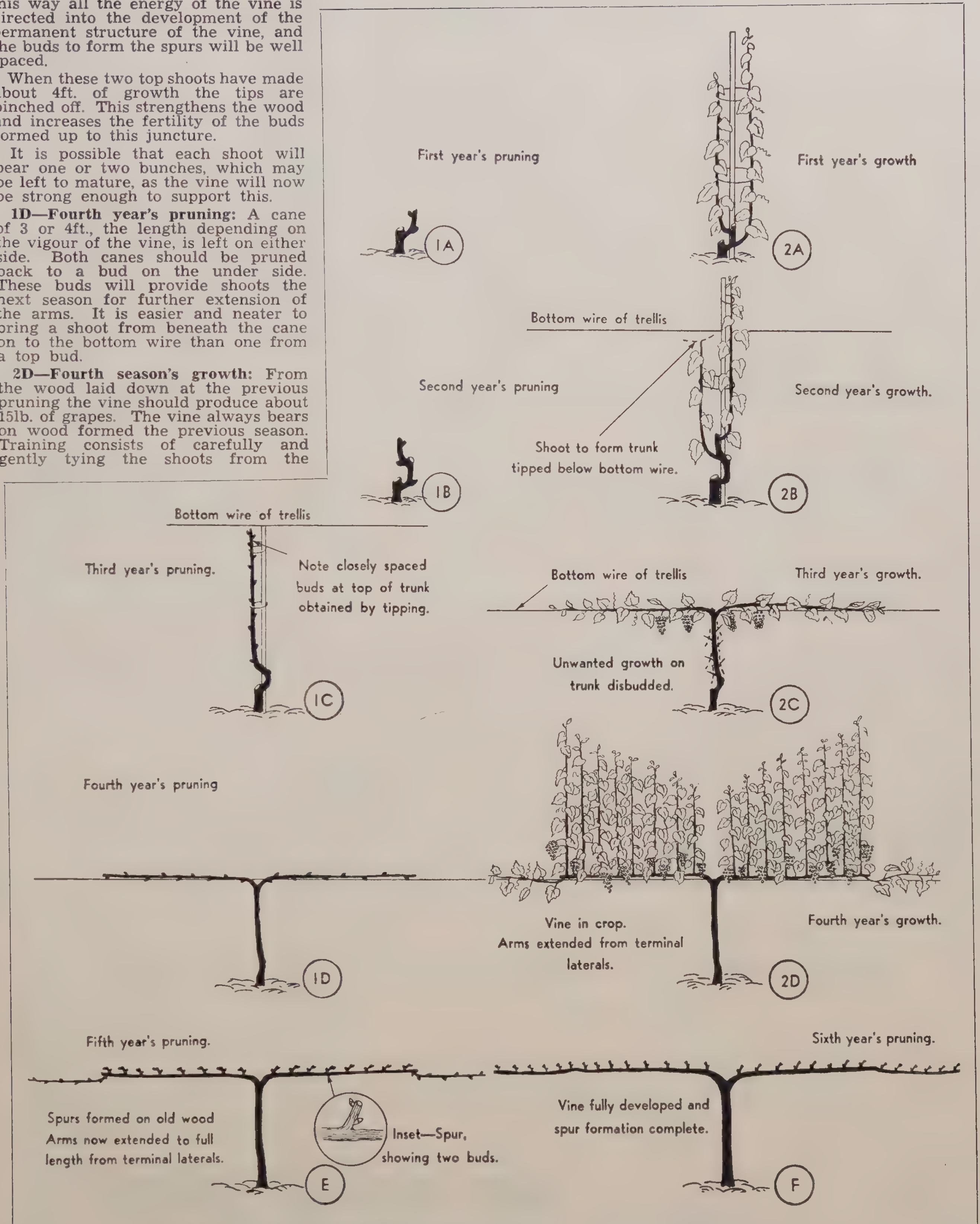
First year's pruning
1A
First year's growth
2A
Bottom wire of trellis
Second year's pruning
Second year's growth.
Shoot to form trunk
tipped below bottom wire.
1B
2B
Bottom wire of trellis
Third year's pruning.
Note closely spaced
buds at top of trunk
obtained by tipping.
1C
Bottom wire of trellis
Third year's growth.
Unwanted growth on
trunk disbudded.
2C
Fourth year's pruning
1D
Vine in crop.
Arms extended from terminal
laterals.
Fourth year's growth.
2D
Fifth year's pruning.
Spurs formed on old wood
Arms now extended to full
length from terminal laterals.
Inset—Spur,
showing two buds.
E
Sixth year's pruning.
Vine fully developed and
spur formation complete.
F

Fig. 6—Training and pruning grape vine on the spur system.

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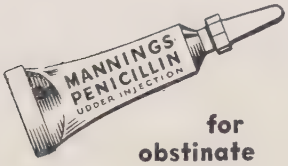

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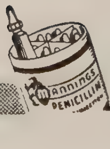

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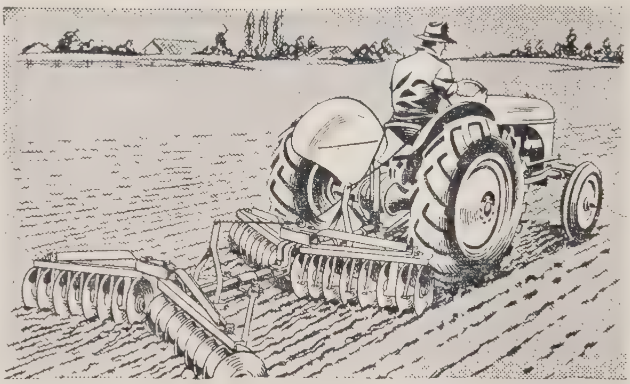

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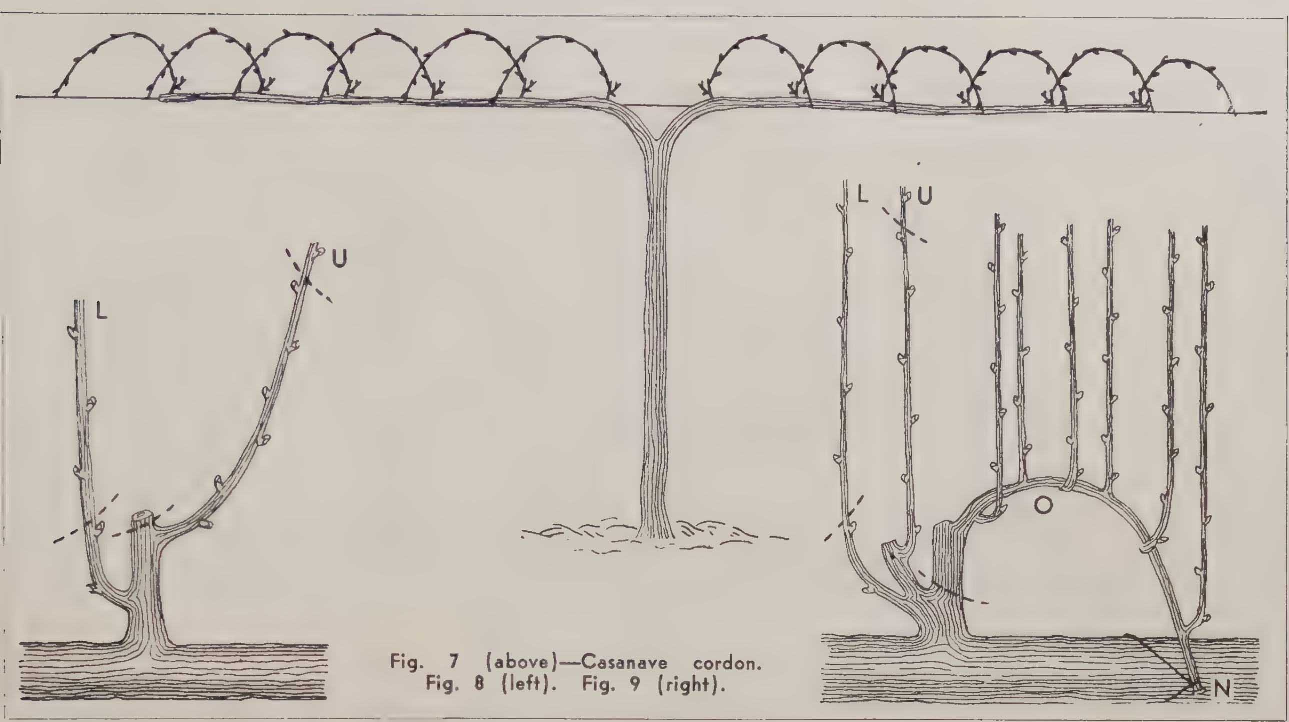


Fig. 7 (above)—Casanave cordon. Fig. 8 (left). Fig. 9 (right).

terminal bud of each arm along the wire for the extension of the permanent arms, each of which may be made about 8ft. long, giving a total spread of 16ft.

The laterals formed on the fruiting wood should be tipped when extended about 6in. above the top set of wires. Further tipping may be necessary to limit the growth to this.

E—Fifth year's pruning: The laterals which carried the crop the previous season are pruned back to spurs of two buds. The new extensions of the arms formed the previous season are pruned back to give each arm a full length of 7 or 8ft. In commercial plantings where vines are growing in competition one with the other the maximum extension of the vine is usually about 10ft.

In the rich soil of the home garden vines can be given further scope with advantage. As large, extended vines often live to a great age and produce prolific crops, even 16ft. is by no means a limit in all circumstances. The vine pruned as above will produce fruit on the spurs and also on the cane laid down for extension of the arms.

F—Sixth year's pruning: The bottom cane of each spur is pruned back to two buds and all other wood cut off. The laterals from arm extensions are likewise spurred back to two buds. Each year now at pruning the spurs are renewed from growth nearest the main arm. The object of renewing the spurs as close to the main arm as possible is to avoid unnecessary extension of the spurs.

Where a strongly rooted vine is planted in fertile soil stage 2B may be proceeded with the first growing season to bring the vine into crop a year sooner. If this is done, 2B should be taken as the first growing season instead of 2A and the sequence of training and pruning followed from the former.

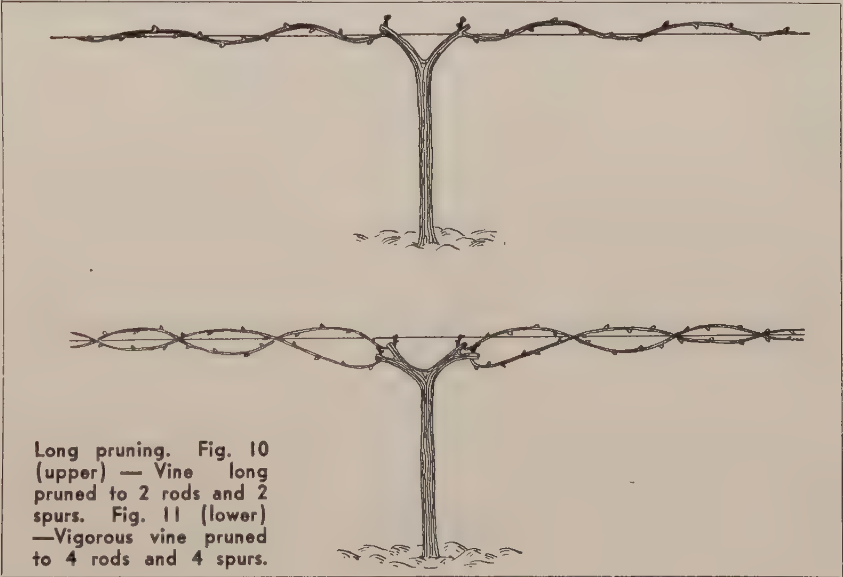
Modification of System

Pruning of a vine as described is the simplest method for the amateur grower. This method is known as the Thomery espalier or bilateral cordon system of short pruning. Not all varieties bear their best on this system, and modification to a Casanave cordon may be adopted if cropping is unsatisfactory.

In any case the establishment of spurs precedes a modification to the Casanave cordon system, which appears as in Fig. 7.

The change is effected by shortening the upper cane formed from each spur to about six buds and tying this to the main arm, and by cutting back the lower cane from each spur to two buds as previously. The short canes are removed at the next pruning and replaced by the canes from the top buds of the spurs. The same procedure is repeated in subsequent pruning.

By carefully exerting a bending pressure at each internode of the short bearers, using both hands and starting from the base, it is possible to make them more pliable and bring them down on to the main arms for tying without much risk of their breaking. The pruning of growth from a two-bud spur to form a cordon is illustrated in Fig. 8 L. The cane from the lower bud of the spur is pruned back to two buds to make a new spur. U, the cane from the upper bud of the spur, is pruned back to about six buds to form a short bearer.



Long pruning. Fig. 10 (upper) — Vine long pruned to 2 rods and 2 spurs. Fig. 11 (lower) —Vigorous vine pruned to 4 rods and 4 spurs.

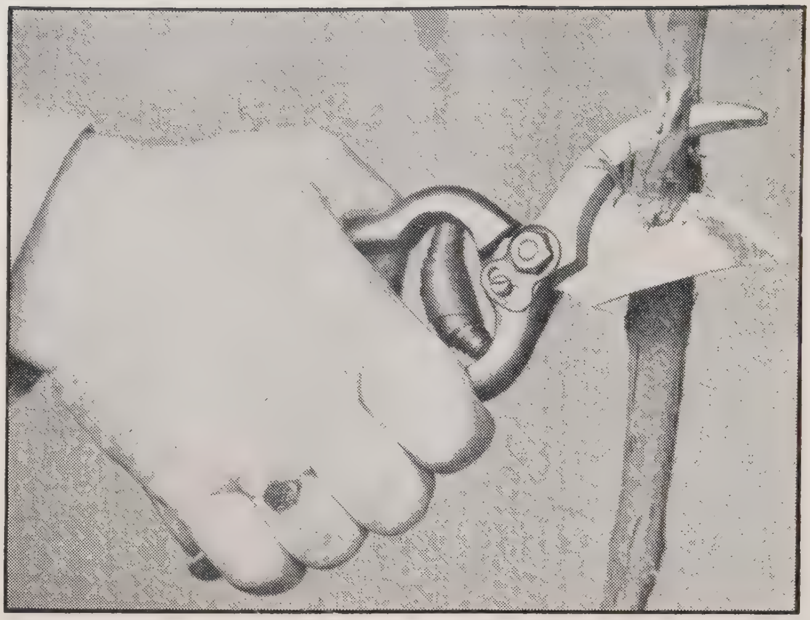


Fig. 13—Correct way to hold secateurs to prune off unwanted wood.

Fig. 9 shows the pruning of a cordon. The cane (L) from the lower bud of the spur is pruned back to two buds to make a new spur. The cane (U) from the upper bud of the spur is pruned back to about six buds to form a new bearer and the old bearer (O) is removed. The pruning cuts in Figs. 8 and 9 are shown by dotted lines. The bearer O in Fig. 9 is cut through the seventh node at N to form a flange for more secure tying. To form short bearers on the whole length of the arms every year may overtax the vine. If the vine shows a decline in vigour, the number of short bearers should be reduced to perhaps half, making a short bearer at every alternate spur.

In most commercial vineyards in New Zealand the Bordelaise espalier or double-Guyot system of long pruning is adopted. Usually one spur and one cane or rod of 3 to 4ft. are formed on each side of the trunk (see Fig. 10). With very vigorous vines sometimes two canes are laid down on each side instead of one (see Fig. 11).

Replacement of Canes

For each cane laid down a spur of two buds should be left as near the vine trunk as possible to replace the cane the following year. The canes produce the strongest growth toward the end, and if spurs were not left to provide replacement of the canes, growth some distance from the trunk only would be found strong enough to lay as replacements. This would result in an extension of non-fruiting wood.

Fig. 12 shows how the same vine in Fig. 10 would appear before the next pruning. The dotted lines indicate where to prune. If no spurs were provided, only a cane as far away from the trunk as perhaps A may be strong enough for a replacement, in which case the wood from A to the trunk would be unproductive. Vines bear only on wood formed the previous season.

The amount of wood to leave at pruning is decided by the cropping and vigour of the vine.

If a vine is carrying a good crop and at the same time making vigorous growth, the pruning is correct. When, however, a vine is carrying a large crop but making only weak, spindly growth pruning has not been sufficiently severe. If a vine is allowed to overbear in this way year after year, it will become permanently weakened and may even die. Even if corrective measures are not delayed to the latter extent, harm can be done as a result of some of the buds going "blind" or failing to shoot, leaving unproductive spaces on the permanent framework of the vine.

The other extreme is when a vine is making heavy foliage growth and very little fruit. Here pruning has been too severe and unless more wood is left at pruning such a vine will never crop satisfactorily. Over-pruned vines also throw shoots known as water-shoots from the trunk. Sometimes these shoots can be used for reforming an old, debilitated arm, but are otherwise useless and should be disbudded as they appear.

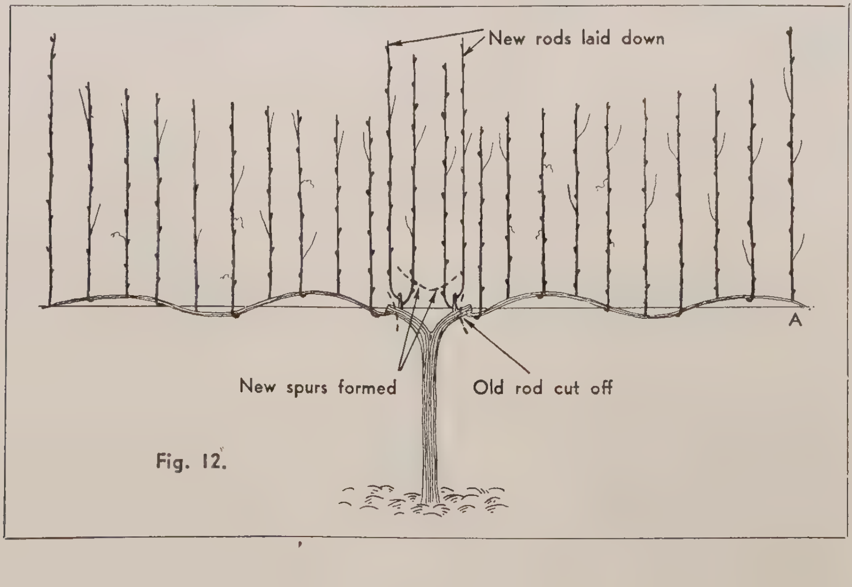


Fig. 12.

A pruning cut on fruiting wood should not be made closer than ½in. from the bud. Fig. 13 shows the correct way to hold the secateurs for cutting away unwanted old wood cleanly. The blade should always be held next to the plant.

(To be concluded.)

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◆

Book Review

"Sheep and Property Management": E. H. Pearse

MR. PEARSE'S well-known textbook is written for sheep farming in Australia, and this 7th edition maintains the excellent standard already set. It contains much which should be of interest and value to New Zealand sheep farmers. Chapters on permanent improvements cover water, fencing, yards, shearing sheds, dip tanks, erosion prevention, and shelter belts.

Breeds of sheep are discussed, but emphasis is laid on the Merino, treatment of which is particularly thorough.

Pastures and pasture management, diet of sheep, and sheep diseases are well discussed.

The chapter on the station horse has valuable notes on shoeing.

There is no reference to the use of sulpha drugs and penicillin in the treatment of wounds and acute septic infections. The author also appears to doubt the very thoroughly proved scientific evidence against a previous mating influencing future progeny of a female.

—*A.D.M.G.L.*

Pastoral Review Ltd., Sydney and Melbourne.

◆

Electric Fencing: Its Installation and Maintenance

THE value of the electric fence as an aid to efficient pasture management has been widely discussed. In this article, D. F. Scott, Machinery Instructor, Department of Agriculture, Auckland, explains the workings of the fence controller and gives useful points in its installation and maintenance.

AN electric fence consists of one or more strands of either plain or barbed wire insulated from the ground and electrified from a unit which is powered by either dry cells or an accumulator.

The voltage obtained from the battery is low, usually 6 volts, and is not sufficient to cause discomfort to man or beast, so the fence controller is designed to supply a short pulse of sufficiently high voltage to command respect of farm animals. The pulse occurs at a frequency of about 50 per minute, though on some units the frequency of shock can be varied. Although the voltage is high (about 3000), the current flowing in the fence is very small and this means that the pulse will only shock and not kill.

Single-wire electric fence and iron standards with rubber insulators on curl of standard. This is the popular type of electric fence used for rationing saved grass.

The Controller

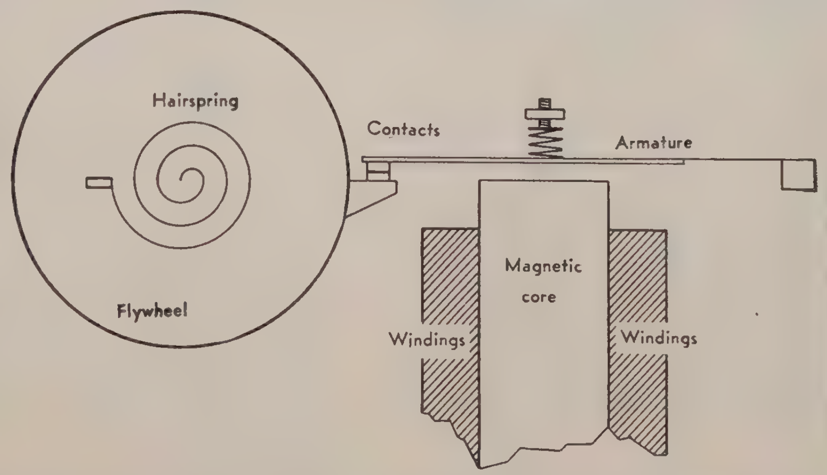
The principle of the electric fence is very similar to that of the ignition system of a car or tractor. Power for both is supplied by a battery and a high-voltage pulse of short duration is required. This is obtained in both by the use of a transformer or a spark coil as it is called in the car. To get the short pulse an interrupter or "make and break" is required and in the electric fence this is usually done by a balance wheel which is caused to rotate against the tension of a spiral spring. The rotating motion is caused by an electro-magnet which is energised when two contacts are closed, one of the contacts being mounted on the perimeter of the wheel. The armature of the electro-magnet gives the wheel a sharp bump, causing it to rotate and tighten the spiral spring. Before the wheel has completed a revolution the spring takes charge and rotates the wheel back in the opposite direction until the contacts close, the magnet is energised, and so the performance is repeated. The frequency at which this occurs depends on the weight of the balance wheel and the tension on the spiral spring. It is generally considered that the fitting of a means of varying the frequency of shock is not necessary.

The saving in power effected by running the unit at a slower speed is very small, and as the accumulator will lose its charge even when lying idle, there is little point in reducing the battery drain by buying an unnecessarily complicated controller unit. A good controller should be compact, strongly made, with as few wearing parts as possible, and should be in a weatherproof case. It is an advantage to have a neon light indicator on the unit to show if the fence is working, but if this is not fitted, a small pocket neon fence tester can be purchased for a few shillings. This tester consists of a small neon tube which is hooked on to the fence wire and a length of flexible lead with a small earth pin to complete the circuit. The earth pin is pushed into the ground and the light is hung on the live wire and flashes if the fence is working correctly.

Earth Connection

Each time the contact-breaker points open there is a pulse of high voltage induced in the secondary winding of the coil which is connected one side to earth and the other to the fence. The connection between the controller and earth is just as important as that between the controller and the fence, so it is essential to provide a low resistance earth to obtain maximum efficiency. The earth electrode can be a metal rod, tube, or plate, which should be buried to a depth of not less than 2ft. and should have a contact area of at least 1½ sq. ft. This should be connected to the unit by copper wire not smaller than No. 14 standard wire gauge.

It is a good idea to have protection against lightning and this can consist



The working parts of an electric fence controller. When the unit is switched on the magnetic core attracts the armature and knocks the flywheel round, opening the contacts and thus de-energising the magnet. The wheel is returned to position by the hairspring and closes the contacts, the magnet is energised, and the performance is repeated.

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Cows controlled by an electric fence while feeding off a maize crop.

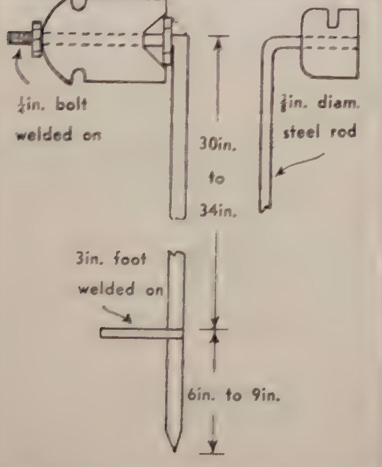
of a ½in. spark gap between fence and earth.

For portable electric fence installations it is not likely that the earth will be up to the specifications given, but in dry weather the efficiency of the earth can be increased by watering.

More than one controller should not be connected to one fence, as the practice may be dangerous.

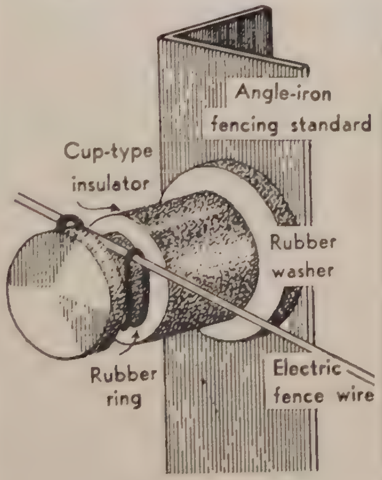
Posts

Any type of post may be used for electric fencing. The material from which the post is made is not important, wood, steel, or concrete being equally satisfactory, but for break feeding of pasture or crop where the fence needs frequent shifting light steel posts which can be easily pushed into the ground and are light to carry are ideal. Light wooden stakes which require hammering into the ground can be used, but there is a constant danger to the insulators, which are very often broken by the shock of the hammering. The light metal type is usually made with a cross-piece or projection so that it can be pushed in with the foot. Corner posts of this kind need to be of special type to stand the extra strain. One post for this purpose consists of the usual upright plus two stays which are screwed into the ground to take the extra strain.



Types of insulators. Left—Porcelain insulator, bolted on to standard made from a steel army picket. The use of a rubber washer is advisable between the porcelain and steel to prevent breaking of the insulator in winter when the steel contracts. Right—Rubber door stop pushed on to the end of the steel rod. A niche is cut in the rubber to hold the electric wire.

Illustration of use of strain-type insulators at end of wire and method of attaching insulators outside the strut.

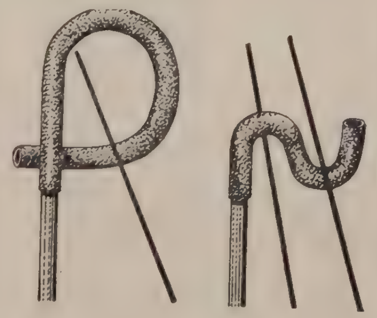


Method of using a rubber ring to hold fence wire in place on porcelain insulator.

Insulators

Types of insulators used for electric fences are many and varied. They vary from the porcelain-button type that is nailed, screwed, or bolted to the support to a piece of old milking machine rubber which can be used in a number of ways to insulate the wire from its support. Rubber door stops have been used successfully by making a slit in the rubber into which the wire is placed.

Rubber insulators have the advantage that they do not break like the porcelain ones, but their insulating properties may not be quite as good and where there are a large number of posts the losses may be appreciable. Fortunately, however, rubber types are more often used with the fence that is moved frequently and an insulator that can be easily and quickly attached to the wire is needed. It is usually found with this type of fence that the number of posts is relatively small, so that the losses would not be serious. With fences of a more permanent type, which are usually larger, the insulators do not have to stand up to continuous moving and can be of porcelain. Egg insulators as used in radio aerials are useful at the end of wires or where there is a bend in the fence.



Methods of insulating the wire on steel standards. That on the right is for use on uneven country. The inside loop is used for a standard placed in a hollow and the outside one is for when it is placed on a rise.

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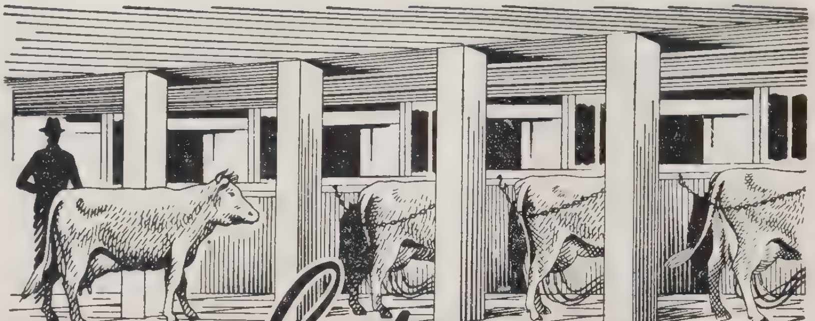

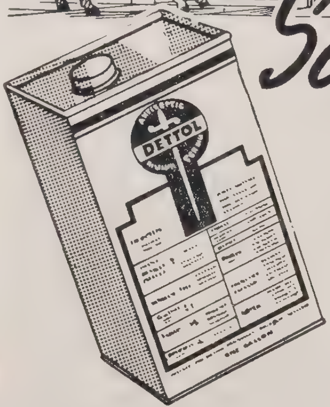

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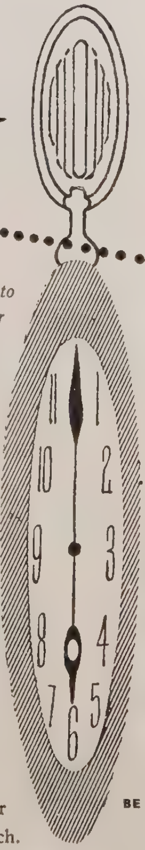

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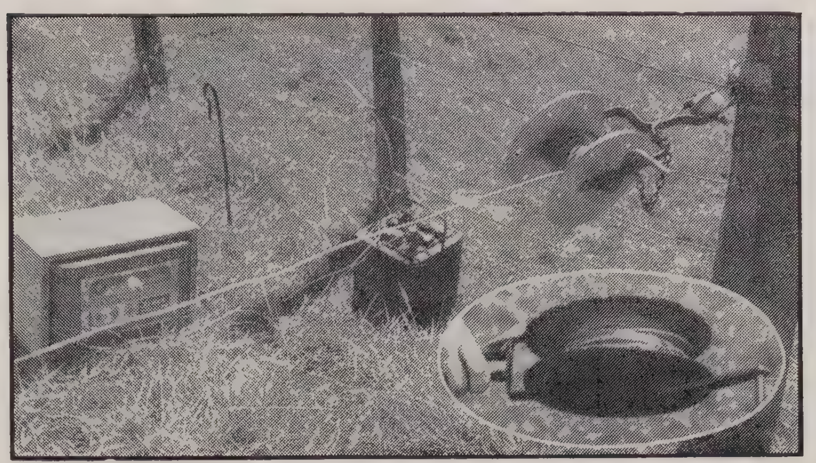
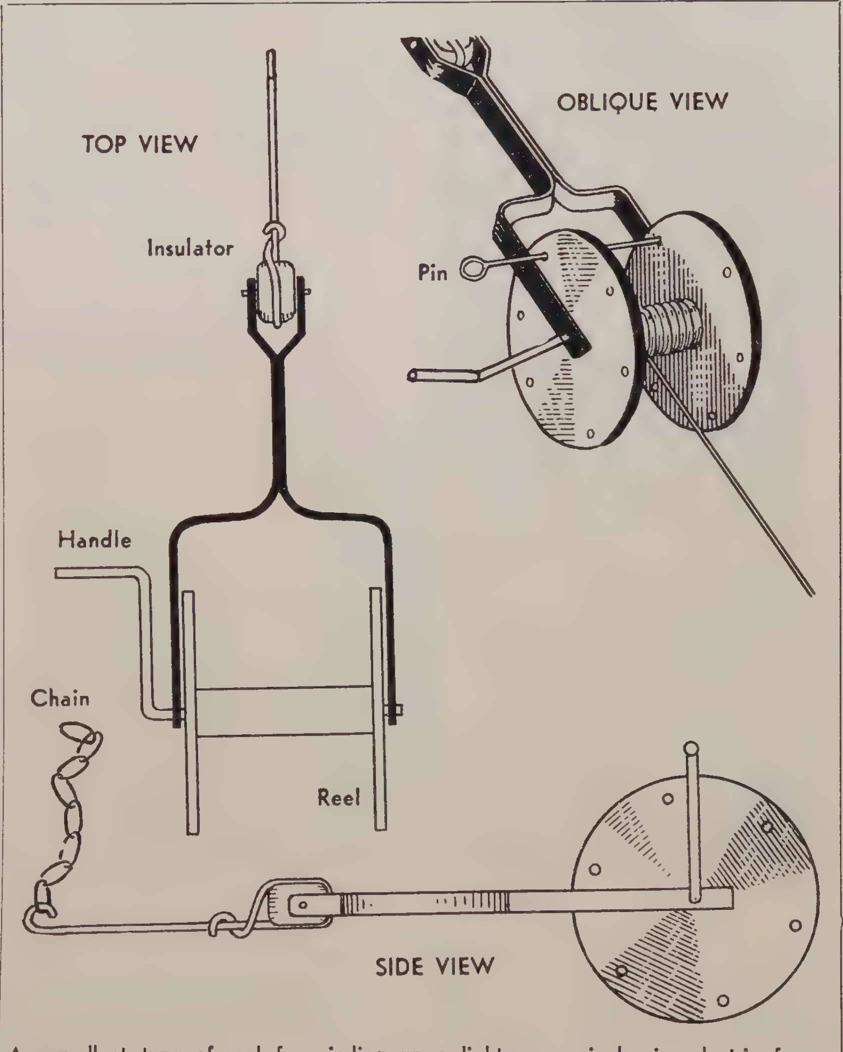


Electric fence unit and pin reel in working position. Inset—Ratchet reel.



An excellent type of reel for winding up a light-gauge single-wire electric fence quickly on dairy farms. This reel also allows quick erection of the next break fence. The chain shown in the side view is put round a post or tree and is fastened with a v-slot link catch.

Batteries

For by far the majority of electric fences 6-volt accumulators or car batteries are used as a source of power. These require regular charging whether in use or not and unless the farm is handy to a motor garage, it is most convenient for the farmer to have his own means of charging the batteries. Where mains power is available a small trickle-charger is most suitable, but in remote districts it would be necessary to use a car-type generator which can be driven by the milking machine or pump engine and should charge the battery while the milking is being done or the pump is in action. It would not normally be necessary to run the motor specially to charge the battery. The alternative to this would be to have a small 1 h.p. motor to drive the generator and perhaps do other odd jobs on the farm. Two batteries would be needed to allow charging of one while the other is on the fence.

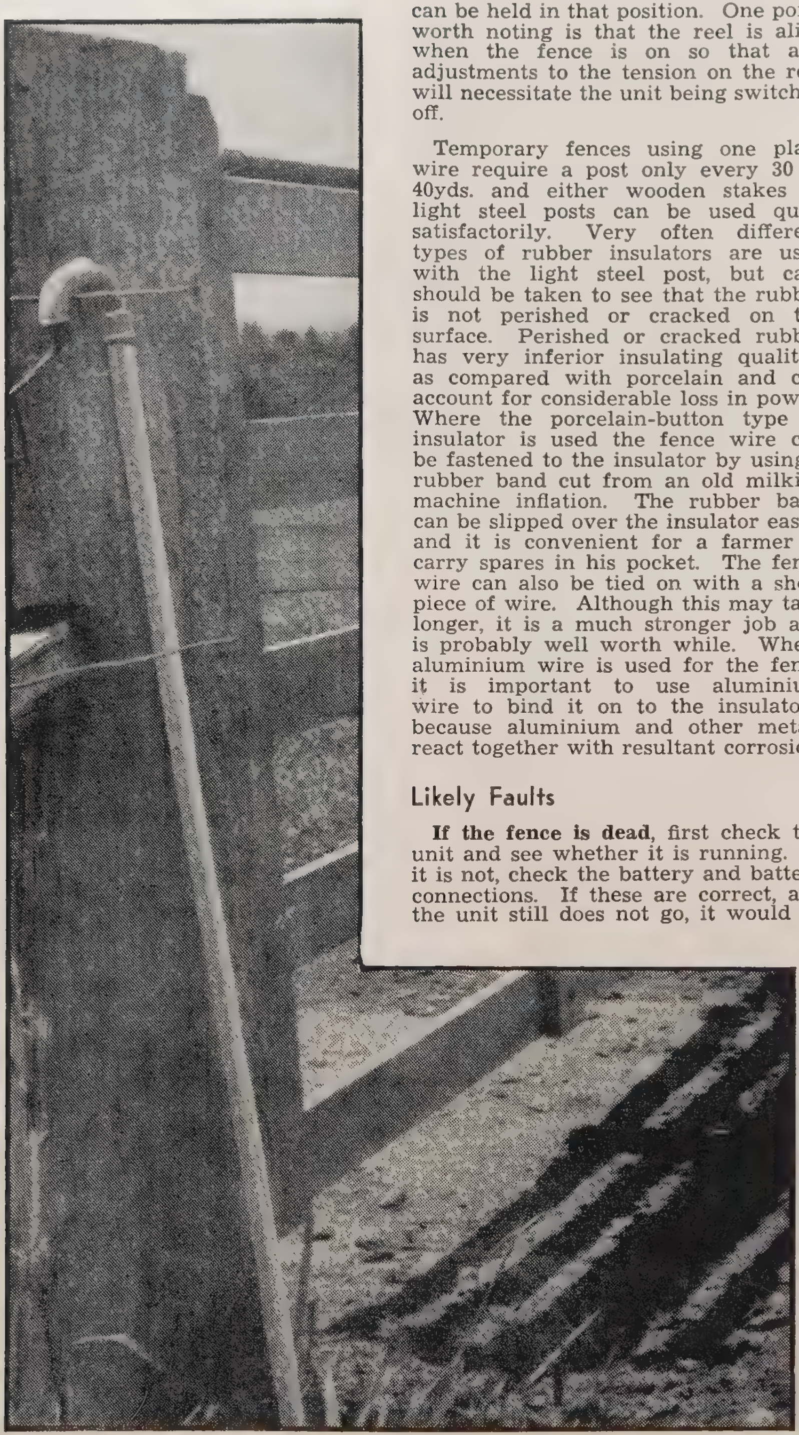
Where a mains-driven charger is used it must never be connected to the battery while the battery is connected to the fence unit.

A supply of either distilled water or rain-water caught in an earthenware vessel is needed to top up the level of electrolyte in the batteries. The level should be checked every few weeks. A hydrometer is useful to check the condition of charge of a battery, which will usually run a fence for 4 to 6 weeks, depending on its condition, the time switched on per day, and the condition of the fence as well as the capacity of the battery. To prevent corrosion a smear of petroleum jelly should be applied to terminals and battery clips. There is no doubt that batteries can best be cared for under the system where the controls and batteries are in a shed, such as the cowshed or barn. This means that the batteries are handy to charger, distilled water, and hydrometer and are more likely to get regular attention. When batteries are not in use they should receive a short charge at least every month.

Using the Fence

Whereas most of the earlier electric fences were of the permanent type, by far their biggest use today is for temporary fencing to enable controlled grazing of pastures and to a smaller extent crops. They are also used extensively for bull paddocks and to protect hay and silage stacks and pits, drains, and shelter belts from stock. The electric fence is also used as a means of controlling bloat. The cows are given very small breaks and are allowed time to digest one break partially before going on to the next. By this means it is possible to feed the cows enough to keep them producing and yet prevent them from getting large intakes of bloat-producing feed.

With permanent fences it is usual to employ barbed wire partly because it pricks as well as shocks, but mainly because the spikes ensure that good contact is made between the animal's body and the fence. Barbed wire is considered most necessary for fencing of sheep or pigs. However, for break grazing of dairy cattle where the fence is moved very frequently, barbed wire is most unpleasant and difficult to handle and, moreover, does not seem necessary, as a single strand of plain



Method of taking electric fence wire underground to cross a gateway.

wire, Nos. 14, 16, or 18, is most effective and much easier to handle and can be used on a metal reel.

The metal reels used on electric fences are extremely useful, as they allow the fence to be wound in or out very easily when it is to be shifted. Some reels are fitted with a winding crank and a pin or ratchet to enable them to be used as light strainers that will pull the wires tight enough and can be held in that position. One point worth noting is that the reel is alive when the fence is on so that any adjustments to the tension on the reel will necessitate the unit being switched off.

Temporary fences using one plain wire require a post only every 30 to 40yds. and either wooden stakes or light steel posts can be used quite satisfactorily. Very often different types of rubber insulators are used with the light steel post, but care should be taken to see that the rubber is not perished or cracked on the surface. Perished or cracked rubber has very inferior insulating qualities as compared with porcelain and can account for considerable loss in power. Where the porcelain-button type of insulator is used the fence wire can be fastened to the insulator by using a rubber band cut from an old milking machine inflation. The rubber band can be slipped over the insulator easily and it is convenient for a farmer to carry spares in his pocket. The fence wire can also be tied on with a short piece of wire. Although this may take longer, it is a much stronger job and is probably well worth while. Where aluminium wire is used for the fence it is important to use aluminium wire to bind it on to the insulators, because aluminium and other metals react together with resultant corrosion.

Likely Faults

If the fence is dead, first check the unit and see whether it is running. If it is not, check the battery and battery connections. If these are correct, and the unit still does not go, it would be advisable to have it serviced by an electrician.

If the unit is working but the fence is still dead, disconnect the fence from the unit and note whether the neon test indicator is flashing. If so, the fence must be shorting to earth and must be checked along its length for:—

Plants touching the wire.

Wire broken and lying on ground or sometimes a stray piece of wire hanging on the fence and touching the ground.

Broken or faulty insulators.

The first two faults will be fairly easy to detect by inspecting the fence and sometimes faulty insulators will be quite obvious too, but if the fault cannot be located it may be necessary to disconnect sections of the fence in turn and so isolate the fault. In this case a start should be made at the far end of the fence and a section disconnected. The unit should then be switched on and checked to see if the remaining length of fence is alive. If it is working, it is reasonable to suppose the fault to be in the section disconnected and a concentrated effort can be made on that section. Although difficult faults like this can occur, fortunately they are not common.

Uses with Different Animals

Electric fences are used in England against foxes and rabbits and in other countries against wild life, including deer, boars, porcupines, skunks, opossums, and even elephants. However, their use with domestic animals is restricted mainly to cattle and pigs.

Varied results have been obtained in the use of the electric fence with sheep. For it to be successful the fence must be used for the first time when the ground is moist and when the wool is short. The use of barbed wire is necessary to get extra penetration of the fleece. Two wires spaced at 6in. and 1ft. 6in. above the ground are claimed to give good results. The widest use of electric fencing is for controlled grazing of dairy cows. Although an occasional cow will develop the habit of walking straight through the fence, the majority respect it and some will become very adept at grazing under the fence in the kneeling position and yet not touching the wire. For cows the wire should be about 2ft. 6in. to 3ft. 2in. high, depending on the size of cattle, but no higher, as there seems to be more tendency to go under the wire than over it.

Electric fences are successfully used by a few farmers for pigs, but the fence should not be introduced first between hungry pigs and their food. Sows in pig can be restrained by two plain wires at 10in. and 16in. above the ground, but there will always be an exceptional pig that will break through and animals in season cannot be controlled satisfactorily by the electric fence.

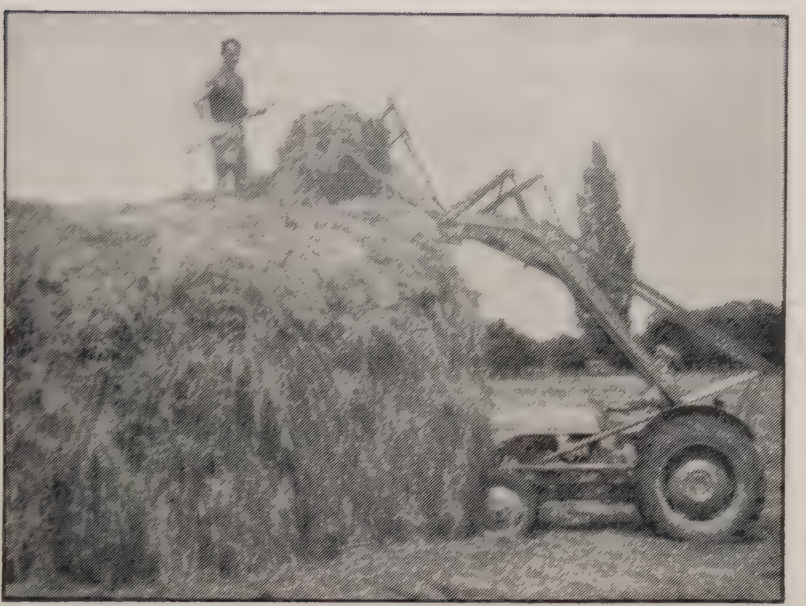
Training

Training with the controller set at a higher than normal voltage seems to have been overstressed in the past. The main requirement in training is that the ground should not be dry, so that the animal can get a reasonable shock. Also the animal should be allowed to find out for itself that the wire will "sting" and not have to be driven up to it or forced against it. If this is done, the animal may be part way under or over the wire before getting a shock, which may serve to accelerate its progress. If the animal finds out in its own time that the wire carries a sting, it will avoid it.

Push-off Sweep for Silage Making

IN past years there has always been a limit to the amount of silage the average dairy farmer could make, a limit governed by the labour and time available to complete the job. Any surplus of material above that put into silage was made into hay. During the last 2 years, however there has been a change in silage-making technique with the use of the buckrake attached to the rear of the tractor and operated by the hydraulic system. Although this method has won favour with large numbers of farmers, the use of the push-off front-end sweep is also worthy of consideration, and here J. R. Murray, Instructor in Agriculture, Department of Agriculture, Hamilton, describes this method of making a silage stack.

IN the past the equipment necessary for handling green material was confined mainly to horse and tractor sweeps and the grab stacker. Little improvement was made in this equipment and therefore with the increasing difficulties of labour problems there was little hope of increasing the acreage cut for silage. As baling of hay became more popular, particularly with the advent of the automatic pick-up baler, the area cut for hay increased temporarily. Variations in seasonal conditions also altered the proportion of silage or hay made. However, the buckrake and push-off sweep brought about a change.

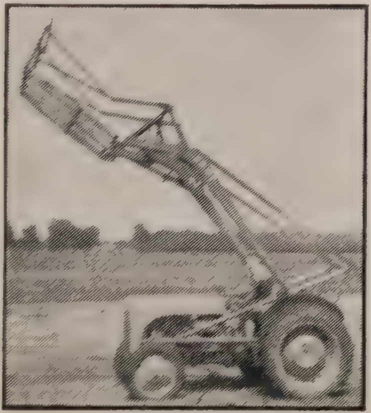


The push-off sweep lifting material on to the stack. No extra labour was required on this farm and more silage was made.

Good Stacks Built

Stacks built with the push-off sweep are evidence that just as good a product is made as with the buckrake. For large stacks the buckrake and grab stacker are most suitable, because the material is dumped on the stack at the required spot, and there is little need to shift it unless building is being done around the edges, where even placement is necessary. With the push-off sweep, if the stack is of large diameter, the tendency is for the loads to be dumped nearer the edge of the stack and less in the centre.

The smaller-diameter stack, up to 20ft., is ideal for obtaining the best-quality silage with the push-off sweep.



The push-off mechanism fully extended, with the points just over 13ft. from the ground.

Until the stack reaches a height of 6 or 8ft. the dumping of the material can be fairly even right to the centre. As the height increases care must be taken to keep the centre filled by forking the material into it. The tractor must be able to approach the stack from any position so that the load can be dumped where it is wanted. For this requirement a good site should be chosen. As each load is dumped more consolidation takes place at the point of dumping; therefore, the aim should be to spread the dumpings evenly to obtain a well-built stack. If these points are kept in mind really good silage can be made.

Saving of Time and Labour

Although the time factor is important for allowing the necessary heating to take place, the total time required for putting in the silage is about three-quarters of that taken by the old method. Two men, one on the stack and the other on the tractor, can make all the silage required for a 100-acre farm. Where a second tractor is available for sweeping in to the stack the job can be done more quickly, but this method needs two men on the stack. In this way up to an acre an hour has been done.

The imported equipment is made up of the hydraulic system and the long arms. Instead of the usual bucket or loader, a locally made sweep is attached. The back part of the sweep is activated by a hydraulic cylinder attached to one of the main lifting arms. The maximum height of the lift is usually just over 13ft., but with the larger types of tractors the height may be slightly more.

For those who favour silage in the stack instead of in the trench, pit, or clamp as made by the buckrake, the push-off sweep is highly recommended, especially where harvest labour is scarce.

A four-men team building a 27ft.-diameter stack, which is a little too large for building with a push-off sweep.

Care of Livestock during December

Contributed by the Animal Research Division

PIG PRODUCTION

FARROWED sows should receive a daily ration of 4 gallons of milk plus 2/3 gallon for each pig suckled. Newly weaned pigs should not be overfed; 1½ to 2 gallons per day in three feeds is adequate for the first 14 days. The ration can then be slowly raised to reach 2½ gallons at the end of the first month. Replacement breeding stock should be selected from the bacon pens, and only the fastest-growing sows with good strong feet and at least 12 well-placed teats should be chosen.

CARE OF EWES AND FAT LAMBS

As each lot of lambs is sold the mothers should be drafted off together with any dry ewes which may remain in the flock. If feed is short and the ewes have very little milk, it usually pays to wean all the lambs, which can then be given the best grazing available. The ewes should be shorn and those which are to be retained should be placed on short pasture with ample water. This will help to reduce their condition and will result in a better lambing percentage in the following season.

SHEARING

If ewes with lambs are to be shorn, every effort must be made to reduce the time lambs are away from the ewes, as it is easy to dry ewes off at this time of year. They should be brought to the shearing shed in small mobs and should be dagged before reaching the board.

DAIRY COW NUTRITION

Dairy production for the year can be materially affected by feed conditions during summer. Cows fed poorly now not only produce less milk during summer, but also will dry off earlier in autumn. Dairy statistics show that long lactation is very important, so feeding silage or other supplementary milk-producing fodders should be started as soon as pasture begins to dry off. It should never be left until milk production begins to show a material fall.

COWS RETURNING TO THE BULL

If cows are returning to service, the mating records should be examined to see if any particular bull is to blame. If this is so, it is wise to have a veterinarian or Livestock Instructor collect a semen sample for examination. Care is necessary when purchasing replacement bulls. If possible, a young bull that has not been used previously should be bought. A bull should never be bought in the saleyard unless his full history is known. Washing out cows seldom helps and may cause trouble if irritant fluids such as kerosene are used. It pays to consult a veterinarian as soon as the cows are noticed returning to service in unusual numbers. He cannot be expected to diagnose the trouble months later.

FOOT-ROT CAN BE ERADICATED

Farmers who wish to eradicate foot-rot from their flocks should obtain a copy of Department of Agriculture Bulletin No. 325. This is the season in which the eradication campaign must be planned.

FOWL POX

So-called roup is often fowl pox. Specimens should be sent to the Department of Agriculture Animal Research Station, Wallaceville, for diagnosis. Outbreaks of this disease can be prevented by vaccination, of which full details may be obtained from the nearest Poultry Instructor.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during September and for the 2 months ended 30 September 1952, with comparative figures for the same month and 2-monthly period of 1951, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

		Tons		Percentage
Period	Creamery	Whey	Total	inc. or dec.
September 1952	16,413	284	16,697	—
September 1951	13,383	234	13,617	—
Increase or decrease ..	+3,030	+50	+3,080	+22.618
2 months ended 30/9/52	25,352	389	25,741	—
2 months ended 30/9/51	22,266	347	22,613	—
Increase or decrease ..	+3,086	+42	+3,128	+13.832

Butter in store at 30 September 1952 was 16,973 tons

CHEESE

		Tons		Percentage
Period	White	Coloured	Total	inc. or dec.
September 1952	7,539	7	7,546	—
September 1951	6,219	2	6,221	—
Increase or decrease ..	+1,320	+5	+1,325	+21.298
2 months ended 30/9/52	8,882	7	8,889	—
2 months ended 30/9/51	7,888	2	7,890	—
Increase or decrease ..	+994	+5	+999	+12.661

Cheese in store at 30 September 1952 was 5,770 tons

If these figures are converted into butterfat equivalent there is an increase of 13.673 per cent. in butterfat graded for the 2 months as compared with the corresponding period of the preceding season. It should be noted that the above figures refer only to butter and cheese graded for export, and that owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Pasture Management and Developing Scrub Land

Seasonal Notes by the Extension Division

DURING late spring the aim in pasture and livestock grazing management on dairy farms should be avoidance of rank growth on grazed pastures. Closure of fields for hay and silage allows concentration of stock on a restricted area, but if feed becomes rank, the mower should be used to trim pastures. Topping of a pasture should follow within a day or two of grazing by the dairy herd, and dairy heifers and dry cows should be used to clean up the cut herbage, which they will do very readily as soon as it wilts. The aim should be to do most of the pasture topping in November, because if it is done then, the pastures will carry a much better growth into January.

GRASSING SCRUB LAND

INCREASED primary production depends very largely on the development of North Island scrub land. On ploughable scrub-covered land the scrub should first be crushed with a heavy crushing roller or heavy giant-disc harrows. After the crushed scrub has been fired the seed-bed for sowing to grass is often prepared by surface cultivation, heavy disc harrows being used. Although quite a considerable area of scrub-covered land has been brought into grass after this type of cultivation, it is not considered the best method where the land can be ploughed. On some areas, particularly where the soil is light, the standing scrub can be ploughed directly under the furrow slices without any prior crushing and burning. This is particularly so on light sand-dune country, where an extra wide and deep furrow can be turned with a giant single-furrow swamp plough. On pumice land where the scrub covering is light it can also be ploughed under quite satisfactorily with a double-furrow semi-swamp plough, but it is necessary on most pumice areas to crush and burn the scrub covering before ploughing so that the deep ploughing necessary to cover the scrub can be avoided.

HEAVY LAND

Success in developing heavy land is dependent on three main points. First, after the scrub covering has been burnt it is important to plough heavy land, if possible, rather than take the easy way and surface cultivate with disc harrows. For proper preparation of the seed-bed for grass and clover it is advisable to plough twice. The first ploughing should be done during March or April and the second during the following October or November so that a good, firm, fine seed-bed can be worked down during summer. The seed-bed should be ready for sowing in late February or early March. The second point is the necessity of sowing early with Certified strains of grasses and clovers, and the third point is the use of adequate supplies of lime and phosphate. Ground limestone should be applied at the rate of up to 1 ton per acre before sowing the grass seed mixture. A dressing of phosphatic fertiliser at 3cwt. per acre should be applied at the time of sowing and followed by a further application during spring of 2cwt. per acre. It is a waste of money and effort to do the cultivation work thoroughly and sow a cheap grass seed mixture or neglect to use sufficient lime and phosphate. It is also just as wasteful to sow Certified strains of grasses and clovers on a poorly prepared seed-bed even if sufficient quantities of lime and phosphate are used. Poor cultivation generally means a loose seed-bed and invariably results in late sowing, which is disastrous; early sowing on a well-prepared, firm seed-bed is the keynote of success.

LIGHT LAND

The soils of the pumice, coastal sand, and ironstone areas come under the heading of light land. They are very light, practically devoid of humus, and their development requires careful treatment, the aim being a well-consolidated seed-bed. These soils respond to phosphates and potash; the ironstone soil also demands lime in addition to correct acidity. After crushing and burning, the land is ploughed, worked down, and then sown to permanent grass. The fertility is raised by an application of phosphatic fertiliser and on ironstone land a dressing of lime and potash also. Consolidation of the seed-bed is important when preparing light land for permanent pasture, and rolling the furrow slices down with a heavy roller is the first important operation after ploughing. The seed-bed must be consolidated from the bottom up, and rolling the furrow slices down in the same direction as the ploughing assists to this end. This is followed by working down the rolled ploughing by double discing to a fine seed-bed, followed by tine or chain harrowing to level the surface. The seed-bed should be rolled again before sowing and the seed is covered with light chain or brush harrows and finally rolled again. Much of the undeveloped coastal sand country can be ploughed straight out of standing scrub with a giant swamp plough and sown to crops such as rape, turnips, chou moellier, or swedes, which grow well on this land. Permanent pasture can be established easily after rape or turnip crops by surface sowing the grass seed and tramping it in with a large mob of sheep. This is perhaps the most economical method for grassing this type of country.

—*E. B. GLANVILLE*

Topping a pasture with a tractor mower.

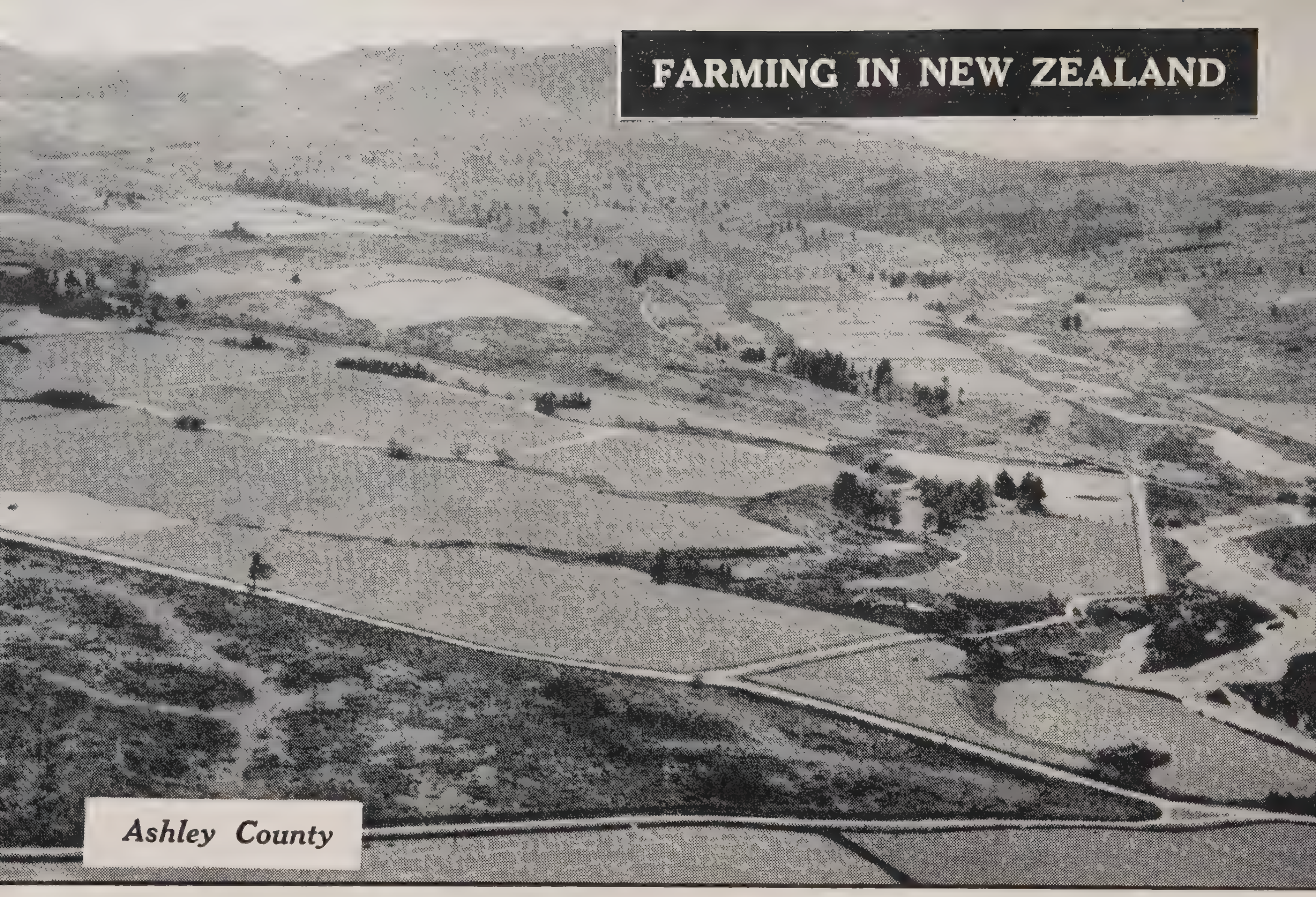
* * *

CUTTING AND BURNING SCRUB

LATE spring to early summer is normally the best time to cut manuka invading surface-sown hill-country pastures in preparation for burning and sowing grass and clover seed in autumn. Although on some of the larger holdings it would be necessary to employ outside labour, the average hill-country unit can usually manage to devote several weeks per year to this class of work. As autumn is generally recognised as the best time for successful establishment of pasture, burning should be planned to allow oversowing to be done in time to catch the first autumn rains, thus allowing the sward to be well established before the advent of frosts. As in any farming practice, it is necessary to assure that the best possible results are gained from the operation. An indifferent burn, with the inevitable re-establishment of manuka, can result only in a repetition of the whole operation within a few years. As felled manuka tends to shed its leaves when lying for a considerable time, thus reducing the chances of getting a really hot fire, the burn for a stand of light scrub should be planned if possible for approximately 6 weeks after cutting. Heavier scrub should be cut earlier than this, since it takes some time for the heavier sticks to dry out ready for burning. This may result in some loss of leaves, but provided the stand is dense enough, sufficient leaves will be held among the fallen scrub to create a hot fire. Other farming activities or unfavourable weather for burning may not always allow this to be done, but the importance of a hot fire with consequent clean burn cannot be overstressed.

—*J. G. MITCHELL*

FARMING IN NEW ZEALAND



Ashley County

ASHLEY County comprises a considerable area of foothill country and rolling clay downs somewhat similar to that large area of Canterbury which stretches in an arc from the downlands to the north and west of Rangiora, through Coalgate, with a break until the Geraldine district, and thence to the downlands stretching out from the Hunter Hills of South Canterbury. Some enterprising farmers in Ashley County in recent years have demonstrated the possibilities of this class of country by creating good mixed farming units. This article by K. Todd, Agricultural Economist, Department of Agriculture, Auckland (formerly Assistant Field Economist, Christchurch), deals with farming in Ashley County and some of the problems of this country. The section on soils was compiled by C. S. Harris, of the Soil Bureau, Department of Scientific and Industrial Research, Christchurch.

FROM the banks of the lower Ashley River stony river terrace land merges into gently rolling clay downs, which become steep and broken as the hills of the north and west are approached. The hilly and mountainous tussock and bush country beyond occupies approximately two-thirds of the total county area of just under 200,000 acres, and some of this country is 4000 to 5000ft. high.

The 173 holdings, ranging from 10 acres to 12,000 acres, in the county support a population of 650. The lower country occupies approximately 66,000 acres, of which 46,500 acres are sown grassland, 5400 acres cash and fodder crops, and 14,000 acres grazing land in the form of tussock, scrub, and swampy country, including deteriorated areas of formerly arable land on the more strongly rolling clay downs.

Settlement and Development

The development of farming in Ashley County has not been one of continuous successful progress. From 1860 onward there have been successive waves of settlement in periods of land booms, and many farming problems today arise from the excessive cropping and too-close subdivision of the clay downs country in the past.

By 1857 practically the whole of the present Ashley County comprised 7 grazing runs, the first of which was taken up in 1851 by John Macfarlane. This run of 20,000 acres was held by Macfarlane until 1862, when he abandoned it. The land did not long remain idle, as some of it was taken up by Irish labourers brought to Canterbury to assist with the construction of the Lyttelton tunnel, and a pattern of small (30- to 100-acre) peasant farms soon clustered round the streams of Loburn.

The land was used mainly to grow cereals, but with the fall in the price of wheat in the 1880's many had to abandon the areas, and it was not long before much of it was infested with gorse and manuka. Some of the runs came within the area of land granted to the Midland Railway Company, which in the late 1880's freeholded the land to settlers and this hastened the haphazard subdivision which followed. The lower and rolling country was sold off in small blocks for mixed arable farming and the hill blocks, deprived of safe winter country, were further reduced in size by subdivision and sale.

Four Major Systems

This subdivision and sale of land was a process which was to continue for a number of years, and there gradually developed the four major systems of farming seen today; semi-subsistence farming, mixed farming, semi-intensive grazing, and extensive grazing.

Semi-subsistence farming developed on the small holdings not abandoned, small flocks of sheep were gradually built up, and a meagre living from farms became possible. Of those farmers who did not sell out in the land boom of 1920 many were forced off by the depression of the 1930's, so that few farms of this category exist.

Mixed farming developed on the better class of land as holdings of 200 acres or more were gradually taken up. A rotation of cereal crops, fodder crops, and pasture and flocks of 200 to 300 sheep have assisted in restoring

HEADING PHOTOGRAPH: Downland area of Ashley County. Considerable portions of this class of country have reverted to scrub and gorse. V. C. Browne photo.

the fertility of some of the lower country, where mixed farming is a feature.

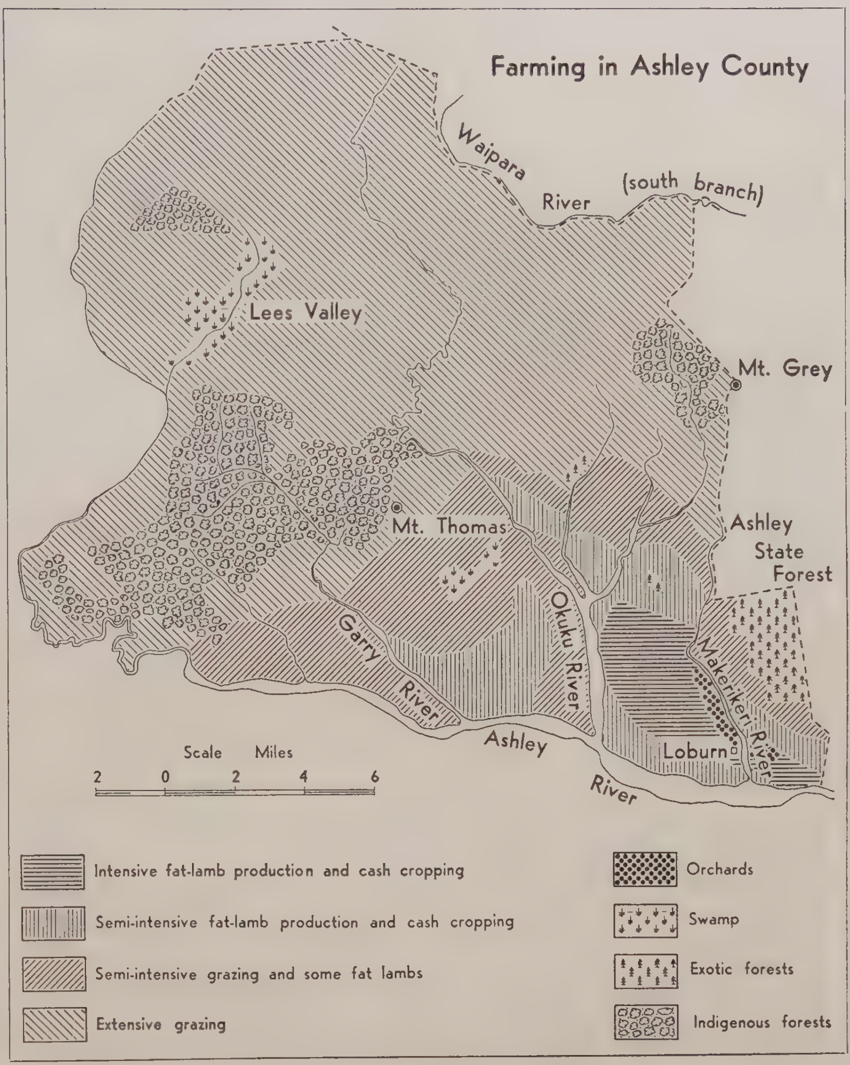
Semi-intensive grazing came to be practised on the more heavily gorse-infested soils of the downlands and parts of the Okuku River terraces after blocks of 400 acres or more were taken up. These were fired and grazed with sheep and cattle. On some of the country gorse and manuka encroachment continues, but improvement has been possible in parts where arable areas and river terraces have enabled fodder crops to be grown for fattening lambs and has thus increased revenue from farms.

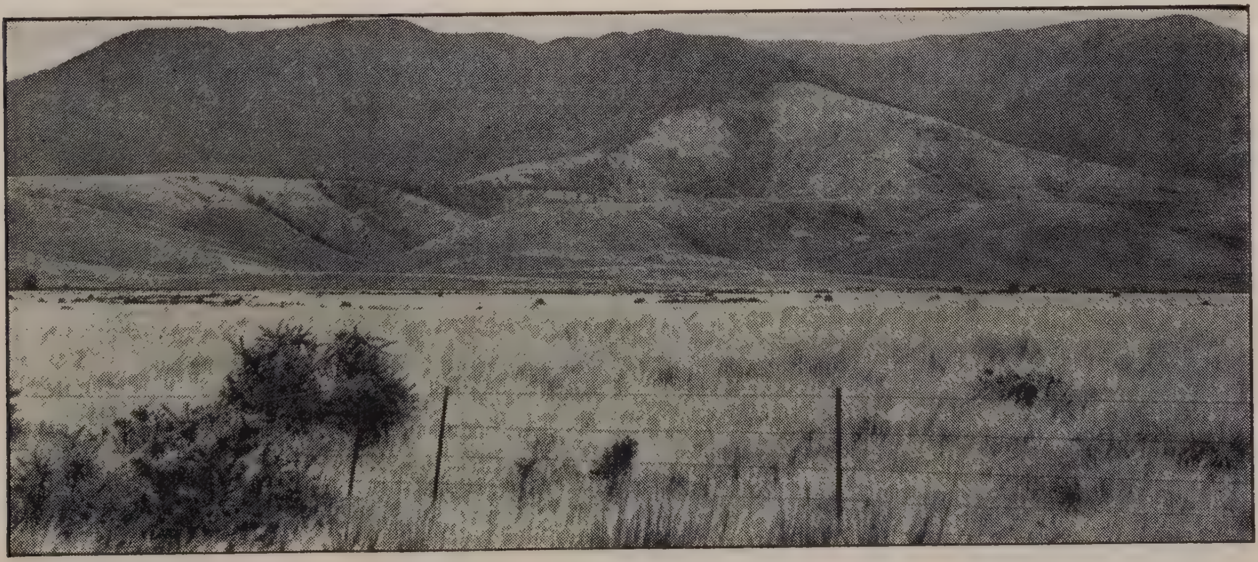
Extensive grazing: The subdivision of the steeper country remains much the same as in 1900 and the land is still used for extensive grazing, with wool the main source of revenue. One area of hill country which has attracted considerable attention is the Lees Valley settlement of 26,200 acres, of which 20,000 acres are in Ashley County. Purchased by the Government and subdivided for settlement in 1917 into blocks of 2500 to 4000 acres, the area has a history of disappointments and failures, which were attributable partly to the initial subdivision being too close. Aggregation of the blocks in recent years has alleviated to some extent the difficulties of farming in the valley.

Climate

There is a sharp difference in climate between the downlands and the hill country of this county. This is caused by the extension of the hills out on to the plains for a considerable distance in this part of Canterbury acting as a trap for south and south-west air currents, differences in altitude, and rain from the north-west in the hills.

The downlands lie approximately within the 30 to 40in. and the hill country within the 45 to 55in. rainfall belts. The average annual rainfall is spread fairly evenly throughout the year, but there are considerable deviations from average distribution. For

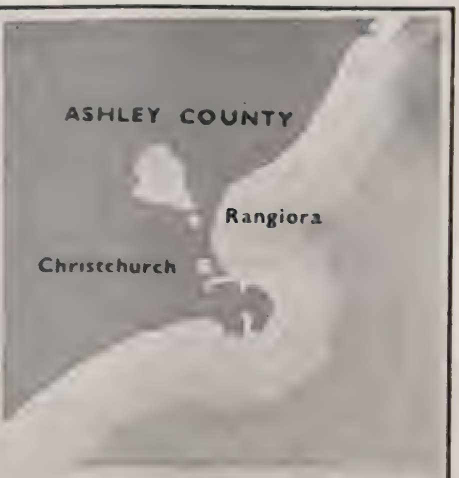

Farming in Ashley County
Waipara River (south branch)
Lees Valley
Mt. Grey
Mt. Thomas
Ashley State Forest
Okuku River
Garry River
Makerikeri River
Loburn
Ashley River
Scale Miles
2 0 2 4 6
Intensive fat-lamb production and cash cropping
Semi-intensive fat-lamb production and cash cropping
Semi-intensive grazing and some fat lambs
Extensive grazing
Orchards
Swamp
Exotic forests
Indigenous forests



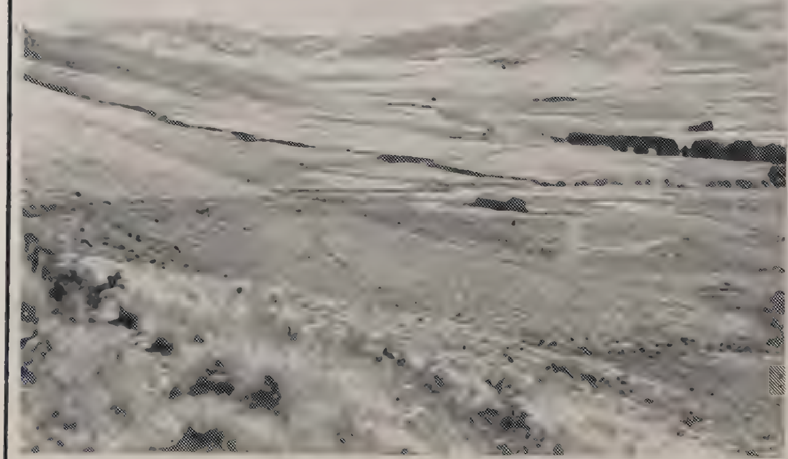
[Green and Hahn Photography Ltd. photo.

Lower hill country, showing part of the forested area. There are more than 25,000 acres of forest reserves in Ashley County.

FARM LANDS OF ASHLEY COUNTY



Upper left—Some of the higher hill country of the county where extensive grazing is practised. Middle left—Lees Valley from the pass at the north end. This is part of the Lees Valley Settlement of 26,200 acres which was purchased by the Government for the settlement of servicemen of the First World War. Lower left—Flat country bordering the hill country. Fertility on these flat areas has declined through their being overcropped. Below—Profile of Hurunui soils. These soils, which occupy about half the area of the county, have numerous angular fragments of greywacke throughout the profile.



Photograph at lower left by V. O. Browne; others by Soil Bureau, D.S.I.R.

instance, falls as low as 0.79in. and as high as 4.74in. have been recorded at Loburn for January and as low as 0.49in. and as high as 6.85in. for June. The effectiveness of the late spring and summer rainfall is reduced considerably by the north-west winds which occur at those times and cause considerable evaporation. In addition, these winds, which are characteristically gusty, sometimes cause damage to crops, shelter belts, and orchards.

The annual range of temperature is not great on the lower country, the recordings at Loburn showing a mean monthly temperature of 41 degrees for July and 64 degrees for January. In the higher country the range is, of course, much greater. Frosts are common in winter and occasionally late frosts cause damage in the orchard area at Loburn. Snowfalls are common in the hill country in winter, and at times severe stock losses are experienced because of late falls in spring. The district is one which has a relatively high number of hailstorms, and the fruit crop at Loburn has occasionally been damaged by these storms.

Soils

The map below gives a general picture of the location and extent of the different kinds of soils, which may be described conveniently according to the kinds of country on which they occur; namely, the plains, the downs and foothills, and the steep hills.

Soils of the Plains

1. Waimakariri-Templeton-Mayfield soils have been formed from greywacke alluvium deposited by the Ashley and Okuku Rivers in geologically recent times. Topsoils are grey and subsoils grey to light brown. Textures range from sand to silt loam, and depth of soil to the underlying stones varies from a few inches to several feet. The shallow and sandy types are droughty, but the deeper soils with a higher percentage of silt are highly fertile. Near the junction of the Ashley and Okuku Rivers these soils receive 30in. of rain yearly, but northward along the Okuku River and westward along the Ashley River the rainfall increases gradually to 40in.

2. Tasman-Ashwick soils, occupying a small area on the floor of Lees Valley, are composed of greywacke fan material from the surrounding ranges. For the most part they are shallow, stony, and of low natural fertility. Deeper pockets of soil occur, but though they are moderately fertile, their productivity is limited by the severe winter cold. In some places, especially on the older, slightly higher Ashwick soils, there has been loss of topsoil from wind erosion.

3. Wakanui-Coopers Creek soils are poorly drained and in parts swampy. Topsoils are silt loams and subsoils are heavy silt loams and clay loams strongly mottled and stained orange brown with iron oxides. In the natural state these soils were swampy, but where they have been drained sufficiently high fertility pastures can be maintained. Around Duck Stream in Lees Valley lie Coopers Creek soils, which would have considerable value if the stream could be controlled and the soils drained adequately. In this area occur patches of peat.

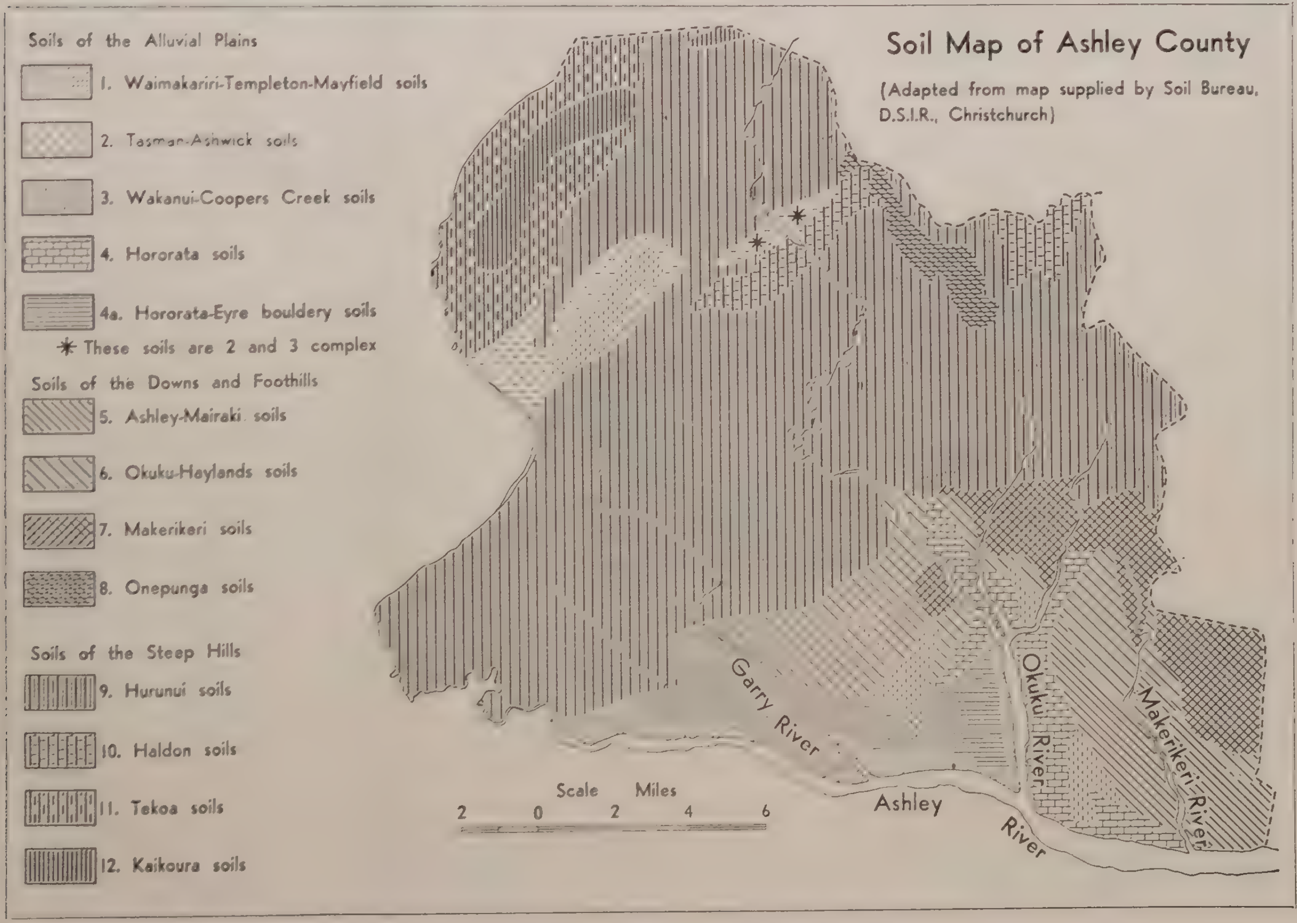
4. Hororata soils are higher lying, older, and more leached of plant foods than the Waimakariri - Templeton-Mayfield soils. Topsoils are brownish grey silt loams; pale brown or pale yellow-brown heavy silt loam subsoils overlie stones at 9in. to 18in. from the surface. These soils are well drained, somewhat droughty, and of medium fertility in cropping.

4a. Hororata-Eyre bouldery soils are similar to Hororata soils, but are bouldery, much shallower, and consequently of lower fertility.

Soils of the Downs and Foothills

5. Ashley-Mairaki soils, occurring on both sides of the Makerikeri River, are on flat to rolling land. They have been formed from coarse loess which overlies greywacke conglomerate and has given rise to naturally weak-structured, light grey silt loam topsoils overlying compact, pale yellow subsoils of slightly heavier texture. The compact subsoil prevents free drainage, especially on flatter land. Ashley-Mairaki soils also occur on the Mairaki downs, on the south side of the Ashley River, where excellent responses to lime are obtained.

6. Okuku-Haylands soils, which lie close to the steep hills, receive a rainfall of 40in. or more. They have developed from a mixture of greywacke, loess, and conglomerate. Beech


Soil Map of Ashley County

(Adapted from map supplied by Soil Bureau, D.S.I.R., Christchurch)

Soils of the Alluvial Plains
1. Waimakariri-Templeton-Mayfield soils
2. Tasman-Ashwick soils
3. Wakanui-Coopers Creek soils
4. Hororata soils
4a. Hororata-Eyre bouldery soils
✱ These soils are 2 and 3 complex
Soils of the Downs and Foothills
5. Ashley-Mairaki soils
6. Okuku-Haylands soils
7. Makerikeri soils
8. Onepunga soils
Soils of the Steep Hills
9. Hurunui soils
10. Haldon soils
11. Tekoa soils
12. Kaikoura soils
Garry River
Okuku River
Makerikeri River
Ashley River
Scale Miles
2 0 2 4 6

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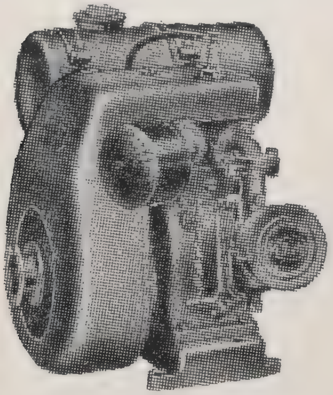

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Looking across the Mairaki downs toward some of the flat areas of Ashley County. One third of the county area of 200,000 acres is flat land and easy rolling country.

forest once covered most of the area, but parts carried manuka and tussock. Topsoils are pale grey silt loams strongly leached of plant foods; subsoils are pale yellowish-grey heavy silt loams strongly iron mottled and with many manganese-iron concretions. On these soils heavy dressings of lime are a prerequisite to the establishment of good permanent pastures. Areas below hill slopes can be improved by mole draining, but this is not done as much as it should be.

7. **Makerikeri soils** border the steep hill country in the south-east of the county. (With these have been included the complex hilly parts of the Okuku soils.) They have been formed under tussock, with beech forest occurring in places. Rainfall is 40 to 50in. per annum and the land is moderately steep. Topsoils are a light grey acid silt loam, usually not more than 6in. deep. Subsoils are usually 6 to 8in. of brownish-yellow stony silt loam, somewhat compacted, overlying light brownish-yellow gravels and silts. Erosion has occurred, especially at the heads of some streams, where "badlands" have appeared after depletion of the plant cover. Considerable areas are in gorse and scrub. Many acres have already been planted in pines, and afforestation is probably the best use to which these soils can be put.

8. **Onepunga soils** are confined to the north-eastern portion of the county near the south branch of the Waipara River, where the rainfall is probably about 40in. They have been formed from siliceous sandstone under a cover of beech forest and manuka on gently rolling to moderately steep slopes. The topsoil is about 6in. of light brownish-grey sandy loam. Light brown heavy sandy loam subsoil overlies orange-brown and ash grey sandy clay loam. The friable topsoil is easily eroded and streams have cut their way down steeply into the parent sandstone. Fertility is low and the cover today is chiefly manuka and browntop. Improvement of pastures is difficult because of the isolation of the area and dissection of the land surface by streams.

Soils of the Steep Hills

9. **Hurunui soils** occupy about half the total area of the county. The parent material underlying steep and very steep slopes, mostly 1000 to 2500ft. in altitude, is composed of greywacke rock, which under an annual rainfall of 40 to 50in. has given rise to brownish and dark grey silt loam topsoil on light greyish-yellow silt loam with numerous angular fragments of greywacke throughout the profile. The original vegetation consisted of tussock, on about half the area, and beech forest, on the remainder. The topsoil, of low to moderate fertility, has a small but fairly durable crumb structure, which enables it to withstand the forces of erosion better than the next three soils (10, 11, 12). Nevertheless, slow sheet erosion is taking place in many parts.

10. **Haldon soils** lie in the north-east of the county, occupying relatively dry steep slopes facing north and north-west. They receive probably 30in. of rain per year. Greywacke rock is the parent material and tussock was the original cover. Topsoils are grey silt loams and subsoils are greyish yellow-brown silt loams. Numerous angular pieces of greywacke are scattered through topsoil and subsoil. In most places the altitude is less than 2000ft. Haldon soils are a little more fertile than Hurunui soils. There is some sheet erosion, but as vegetation will re-establish fairly readily when given a chance, this does not appear to be serious.

11. **Tekoa soils** occur in the north-west of the county at an altitude greater than that of the Hurunui soils and less than that of the Kaikoura soils. The parent substance is steep greywacke, which originally supported beech forest. On it, under a rainfall of 50 to 55in., there have developed shallow brown-grey silt loam topsoils over shallow yellow silt loam subsoils. Fertility is low, and there is marked erosion where fire or over-stocking has weakened the plant cover.

12. **Kaikoura soils** are confined to two areas, north-west and north of Lees Valley, at altitudes of 3000 to 5000ft. In places there is no topsoil, and topsoil depth varies from a fraction of an inch to 6in. Topsoils are grey to pale brown. Subsoils, in places up to 12in. thick, overlie broken greywacke rock and angular pieces of greywacke are scattered through the profile and over the surface. Both topsoil and subsoil are loams of a very loose, powdery nature, which makes them very susceptible to erosion by wind and water wherever the plant cover is depleted. Kaikoura soils, though not extensive in Ashley County, are widespread on the eastern side of the Southern Alps, and where the cover has been burnt severe erosion has usually followed.

Crop Production

Cash Crops

West of the Okuku River some of the soil is stony and not high in fertility, so that cash cropping has been confined mainly to the better and more easily workable soils of the Loburn area, where farms are smaller and income from cropping of importance. Since 1930, however, there has been a marked decline in crops for threshing and greater interest has been taken in fat-lamb raising. As better pastures were established and topdressing with fertilisers and lime became more widespread crops formerly grown were replaced to some extent by pasture-seed crops. A change in price relationships in future may cause some revival of cropping.

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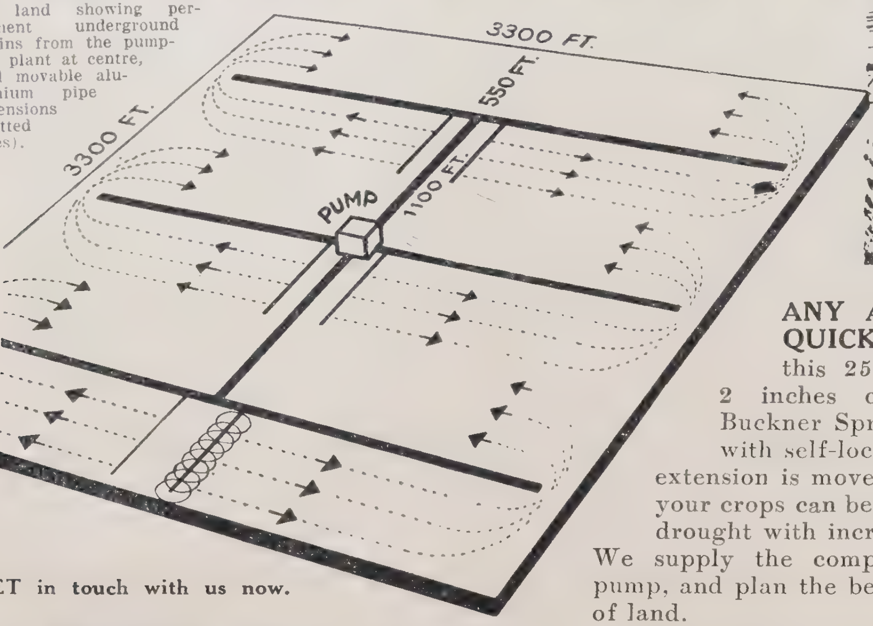

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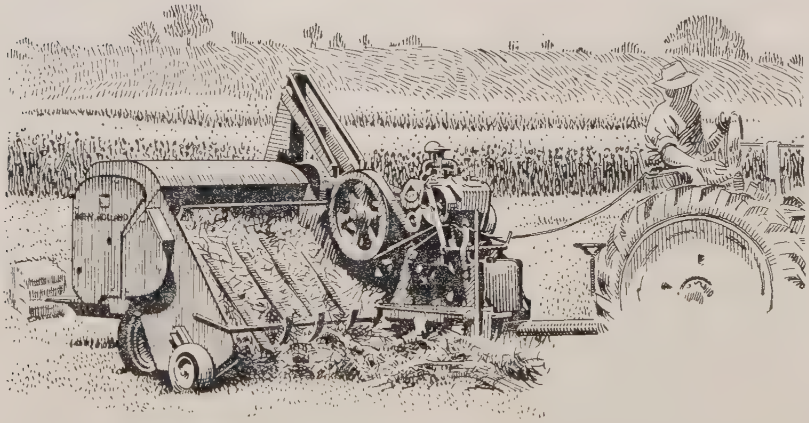

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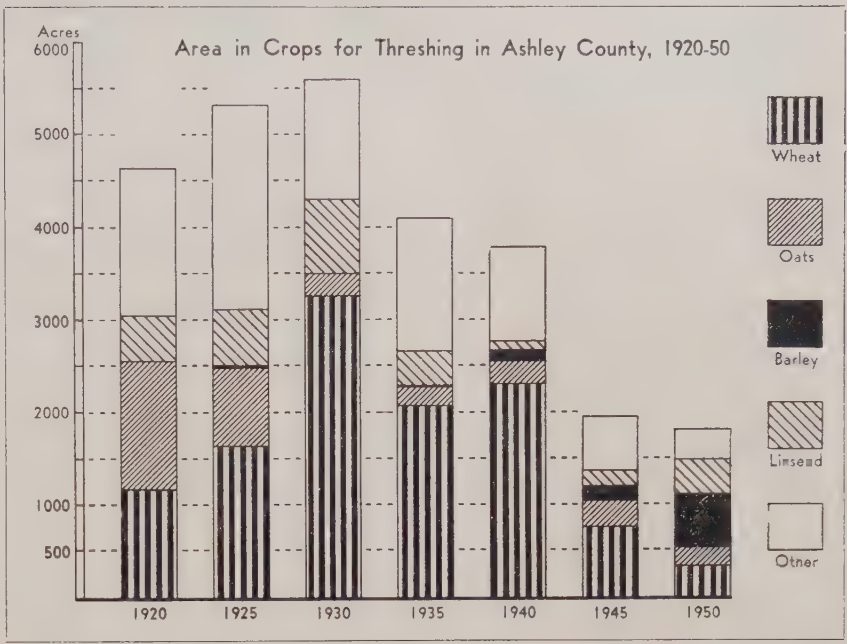

although farmers now realise that most of the county soils are not suitable for successive cereal cropping, and today a cereal crop is sown on an area only if it fits into a rotation not more than once in 5 to 7 years. Improvement in the farms of the county has been most noticeable in the last few years, during which wheat acreage fell from 1284 acres in 1942-43 to 335 acres in 1949-50.

Except during the war (589 acres of linen flax were grown in 1940-41) there has been little change in variety of crops grown, and wheat, oats, barley, and linseed constitute over 99 per cent. of the total area in cash crops.

Wheat production before the end of the depression of the 1930's fluctuated according to prices to some extent, but since that time the trend toward fat-lamb production has been most pronounced and the wheat acreage has been much reduced, except for 1940, when there was an increased acreage.

Oats for threshing have not shown the same marked rate of decline as wheat, because the crop is suited to many of the county soils and can be fed off if required.

Barley: The position with this crop is similar to that for oats. Barley has become more popular since 1939 because of better prices, but even now only about 600 acres a year are grown.

Linseed: Before 1930 linseed was of some importance to farmers in the Loburn and Okuku districts, but after the closing down of the New Zealand factory in that year the acreage declined. A higher price in recent years has stimulated production, and in 1949-50 there was 369 acres in this crop.

TABLE 1—AREA IN CEREAL AND PULSE CROPS FOR THRESHING IN ASHLEY COUNTY

Season		Wheat acres	Oats acres	Linseed acres	Barley acres	Peas acres
1921-22	..	3,467	693	733	—	48
1926-27	..	2,775	565	502	94	58
1931-32	..	2,994	388	88	13	7
1936-37	..	2,404	490	78	5	52
1941-42	..	1,791	351	44	211	2
1946-47	..	304	62	314	235	98
1949-50	..	335	189	369	591	55

Pasture-seed Production

Pasture-seed production has aided farm-land recovery in the county considerably. It provided the initial extra finance needed to renew pastures with certified seed and to topdress regularly with lime and fertilisers. The rapid expansion since 1939 reflects the pasture improvement that has taken place in the Loburn and Okuku districts in that time. In 1939-40, 416 acres were cut for pasture seeds, in 1949-50 the area was 1367 acres, and in the 1946-47 season it reached the high figure of 2088 acres. In 1949-50 red and white clover accounted for 64 per cent. of the area, a considerable amount of the clover being cut in the Loburn district.

Fodder Crops

The total area of fodder crops has remained relatively stable (about 3500 acres) from 1920 onward. The gradual improvement in pastures has given a longer growing period and larger hay crops, and in addition lucerne stands have been established. The result has been a reduction in areas of turnips for winter supplementary feed.

The area in rape, the major fattening crop, has remained fairly stable. There was for a time an increase in the area of green crops fed off, of which oats formed the major part, but this practice has declined in recent years. Chou moellier has been grown successfully during the past few years.

TABLE 2—AREA IN FODDER CROPS IN ASHLEY COUNTY

Season	Hay and silage acres	Root crops acres	Green fodder (rape, etc.) acres	Cereal crops fed-off acres	Total acres
1921-22	98	2,144	1,123	113	3,478
1926-27	88	1,951	1,371	63	3,473
1931-32	60	1,752	1,254	615	3,681
1936-37	255	1,622	1,319	606	3,802
1941-42	293	1,157	1,517	608	3,575
1946-47	606	948	1,094	391	3,039
1949-50	700	1,460	1,492	631	4,283

Sheep

With the subdivision of the extensive grazing runs after 1900 and as a result of the work of the late C. H. Ensor, a noted Corriedale breeder, the Merino breed gave way to the Corriedale, and by 1920 it was one of the most popular breeds in the county and even today it is still very popular.

Since the middle 1920's there has been a gradual increase in the use of Romney and Southdown rams, reflecting the increased emphasis on fat-lamb production, particularly on the low country around Loburn and Okuku. In 1950 these two breeds accounted for 28 per cent. of the rams in the county whereas in 1920 they comprised 1 per cent.

Total sheep numbers remained relatively stable at about 108,000 between 1920 and 1930, but with the onset of the depression of the 1930's the decline in numbers was rapid, owing to financial inability to maintain flock numbers and to about 10,000 acres going out of production and deteriorating rapidly to gorse and scrub. In 1938 and 1939 there was a recovery, but numbers fell again, partly through wartime shortage of labour and materials. In 1948 the low figure of 81,274 was reached, but by 1950 the total had increased to 92,584.

The decline in sheep numbers has not been on the high hill country, but on the intermediate hill areas and on some of the downland, where deterioration to gorse and scrub has occurred. An analysis of sheep numbers on the high-country farms shows relative stability since 1925.

Pasture Production and Topdressing

The growth of intensive fat-lamb farming, which is probably the most significant feature of farming development in the county in recent times, owes much to the availability of better grass and clover strains and to the adoption of improved methods of pasture establishment and management.

Conditions of pasture growth in the different parts of the county vary considerably and are closely related to soil characteristics.

On the Ashley-Mairaki and some of the Hororata soils and the Waimakariri-Templeton-Mayfield soils few problems arise, red clover is a high producer, and the standard ryegrass-white clover pastures established are the basis of fat-lamb farming. Short-rotation pastures are not common, although Italian ryegrass or short-rotation ryegrass is occasionally grown.

On the light cropping lands (Hororata-Eyre bouldery soils and parts of the Hororata soils and the Waimakariri-Templeton-Mayfield soils) the life of ryegrass-white clover pastures is short and they rapidly deteriorate after the fourth or fifth year; the addition of cocksfoot, dogstail, and subterranean clover to such pastures is essential to prolong their life and prevent opening up. Grasses such as cocksfoot and dogstail and subterranean clover are of particular value on the shallow, stony land of the Hororata-Eyre stony soils and the river-terrace soils. Pastures of Italian ryegrass and red clover sown with rape and heavily stocked have been very successful in rebuilding fertility on land deficient in plant nutrients. In the shallower, stony soil areas lucerne or cocksfoot-lucerne pastures are valuable.

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Hill-country Pastures

Hill-country pastures of silver and hard tussocks, browntop, and danthonia provide a good vegetative cover, and cocksfoot, dogstail, and clovers can be introduced by surface sowing. On the exposed shady slopes with southerly aspect the vegetation is more sparse and comprises only the hardier lower-producing species. Bracken fern is extending up the Okuku River, and some areas of broom are appearing on the Okuku Range. Gorse, matagouri, and brier are spreading into the warm back country of the Waipara River basin from the top of Lees Valley.

Sown Grasses

Areas of sown grasses in the county in 1920-21 totalled 37,000 acres, and in 1949-50, 46,486 acres. Fluctuations in area that occurred in this period arose from changes in areas under crops. The regrassing of the poor clay downs country, on which much of the deterioration to scrub and gorse has occurred, is an urgent problem requiring much hard work and skilful management. Most significant is the great improvement in quality of pastures since 1920, which has brought an increase in productive capacity of the county's grasslands.

Topdressing

Topdressing with lime and fertilisers was neglected for many years, because of the conservative attitude of farmers to the practice, because the absence of rail facilities added considerably to transport costs, and because returns from farming were insufficient to permit an outlay for the amounts of lime and fertilisers needed. Lime response, because of the small quantities initially applied, was disappointing, and it is only in recent years that the high lime requirement of most of the soils of the county has been fully realised. The financial set-back caused by the depression of the 1930's was severe, and not until 1936 did the areas topdressed appreciably exceed those of 1930.

TABLE 3—AREAS TOPDRESSED IN ASHLEY COUNTY

Season		With fertilisers acres	With lime acres	With fertilisers and lime acres	Total acres
1926-27	..	44	113	16	173
1930-31	..	965	195	—	1,160
1934-35	..	186	51	831	1,068
1938-39	..	2,426	288	1,273	3,987
1942-43	..	248	1,949	399	2,596
1946-47	..	936	2,143	888	3,967
1949-50	..	2,176	2,956	999	6,131

Deposits of limestone are being worked in the Whiterock-Mt. Grey area.

Farm Management

A description of the four main systems of farming follows.

1. Intensive Fat-lamb Production, Cash Cropping

Intensive fat-lamb production and cash cropping are carried on principally on the Ashley-Mairaki soils and part of the Hororata soils. This area is the only part of the county that can be described as intensively farmed. Aggregation of holdings up to an economic size, about 250 to 350 acres, has been taking place gradually since 1920. Today not more than 20 per cent. of a farm is under crops, which is in contrast with the early 1920's, when as much as 50 per cent. was under the plough at a time.

Corriedale sheep. Top-price wool clips have been produced consistently for many years from Corriedale flocks in the upper area of Okuku.

Products are predominantly fat lambs, followed by wool, fat sheep, pasture seeds, wheat, linseed, and oats, together with a small amount of peas and barley. Production of linen flax undertaken during the war was associated mainly with this type of farming.

Cash crop yields have improved considerably in recent years as proper rotations of about 5 or 6 years have been adopted, but areas cropped have fallen rapidly because of the increased pasture and fodder requirements of fat-lamb farming. The harvesting of pasture seeds (mainly red clover, white clover, and ryegrass), made possible by improved pastures, now assumes greater significance in the farm income than cereal cropping and will continue to do so, at least while price relationships are favourable. Rotations followed vary from farm to farm and from season to season, but a common rotation is: Grass, rape, wheat, greenfeed oats, summer fallow, grass. The growing of fodder crops is essential for efficient management of farms where intensive fat-lamb raising is practised.

Cultivation and drainage do not present any great problem. A large part of the area is free of stones and the soil is readily workable and suitable for maintaining intensive fodder-cropping programmes and for providing good pasture establishment. Depth of ploughing, however, is restricted by the clay in many places. Cultivation practices do not vary markedly, and a fallow following early-summer ploughing and rolling is becoming much favoured, although not practised widely yet. The stiff clay subsoil of the slow-draining Mairaki silt loam area in Loburn causes water to accumulate in hollows, but mole draining can be undertaken.

With improved pastures developed by topdressing and heavy stocking there is a possibility of feed growth in good years getting out of control, but this is obviated by setting aside areas for hay or pasture-seed production.

Flock management: The progeny of Corriedale or half-bred ewes and Southdown rams have earned the district a reputation for quality fat lambs. Romney flocks are also run in a few cases. The aim always is to get as high a percentage as possible of lambs fat off the mothers. Since the end of the depression of the 1930's improvements in feed conditions have increased lambing percentages and today percentages exceed 100. August to September lambing is fairly general.

On most of the small farms sheep replacements are bought in. In some cases these are 2-tooth ewes and in others cast-for-age ewes, from which two lambs may be taken before the ewes are fattened. On larger farms with adjacent rough country or river-bed land breeding flocks are run, Corriedale or Romney rams generally being used.

2. Semi-intensive Fat-lamb Production, Cash Cropping

Semi-intensive fat-lamb production and cash cropping are practised on two very different types of farmland: On one (lower areas of Loburn and Okuku) light, stony soils and small holdings restrict intensive farming; on the other (upper areas of Loburn and Okuku) proximity to hills, more severe climate, and the more heavily rolling nature of the land are the restrictive factors.

The lower areas of Loburn and Okuku lie mainly on the Hororata soils which were heavily cropped in the past, and farms average about 300 to 400 acres and carry 1 to 1½ ewes per acre. A number of small farms in this group, however, are barely economic in size for this type of country in its present condition.

On the upper areas of Loburn and Okuku, on Okuku-Haylands soils, farms vary from 350 acres to 1800 acres. They are on more rolling type of country than the lower areas and have a carrying capacity of 1 to 1½ ewes per acre. These farms are more closely related to the grazing country, and in some cases are run in conjunction with a block of rough grazing land, which accounts for the variation in size of holdings.

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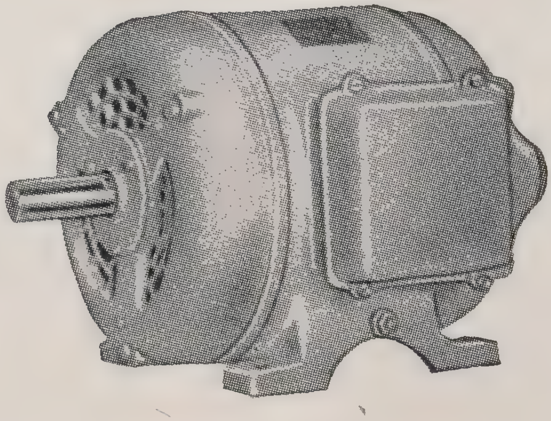

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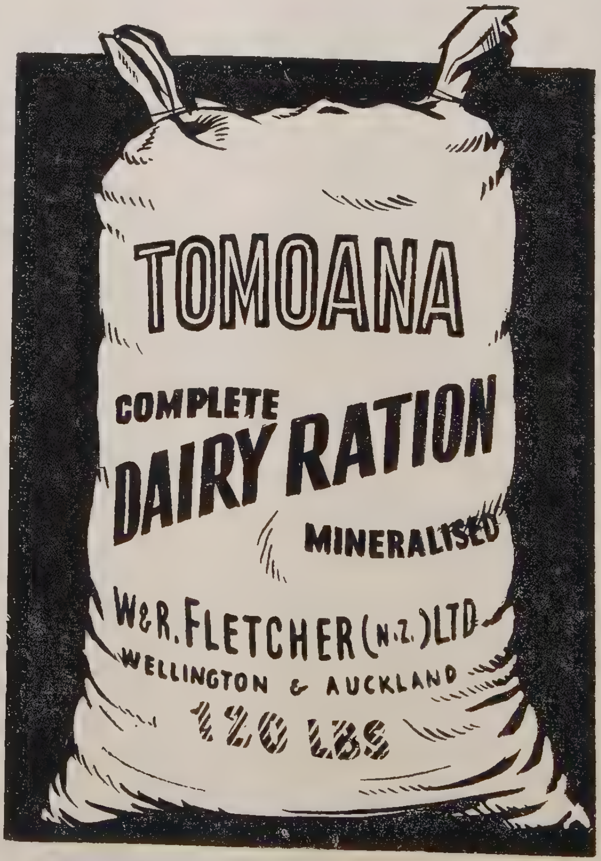

Flats along the Okuku River. [*Soil Bureau, D.S.I.R. photo.*

Many of the features of the larger farms of the upper area and the small farms of the lower area developed from the period of early settlement, when the front country of the grazing runs was sold off in fairly large holdings, initially in some cases to descendants of the runholders. Later the flats in the lower area were closely subdivided, particularly in south Loburn by Irish settlers with a peasant-farming background and very little in resources after they had purchased land. "Mining" of the land by successive cropping followed.

The products from semi-intensive fat-lamb and cropping farms are, in order of importance, fat lambs, fat and store sheep, wool, and cash crops.

Cropping, though restricted by the droughty nature of some of the soils, is of some importance on the small holdings of the lower area—an area of marginal mixed-farm land, where farm returns provide no large surplus and where full substitution of cropping by intensive fat-lamb farming is hampered. Approximately 20 to 30 per cent. of farms is under cultivation each year, depending on the size of farm (the smaller the farm the greater the degree of cropping) and intensity of stocking. Wheat, oats, and barley are the principal cereal crops and yields fluctuate considerably, owing to the droughty nature of the soils.

On the upper area cereal cropping is less important and is further restricted by the severe climate, and in the Okuku district particularly by the force of the "north-westers". Store sheep and fine wools are the main products.

The fodder-cropping programme directly determines the success of fat-lamb production on the lower and upper areas. It forms a large part of the cultivation on the upper-area farms, because growth comes away late in spring (usually in late October, compared with early September on the lower flats). Meadow hay and turnips are the basis of winter feed. Rape or rape and grass are usually grown for fattening, though in recent years chou moellier has come into favour on a few upper farms of Loburn. Lucerne is not grown much and is confined to the lower area of free-draining river-terrace soils. However, careful management and heavy liming and topdressing have produced some good stands, which are very valuable on the lighter stony country.

Since 1935 pastures on the upper farms have received very necessary lime and fertilisers. On the lower areas prolonging the life of pastures is a major problem. After 4 or 5 years' growth many of the high-producing species die through loss of soil moisture in dry periods, pastures open up, and lower-producing species come in.

The control of gorse growth is an acute problem in farm management, particularly on the upper farms in proximity to heavily infested areas under the hills. The shortage of labour during the war hastened the encroachment of gorse and manuka on to good grazing land, and burning, clearing, and regrassing of the best of the gorse-covered land are urgently needed if further incursions are to be prevented.

Flock management on the lower areas is similar in most respects to that on land used for intensive fat-lamb farming, but there is a greater preponderance of Romney lambs and fewer lambs are fattened off the mothers. Half-bred ewes crossed with Romneys or Southdowns predominate and replacements are mostly bought in from the hills. Lambing is timed for about mid-September and percentages vary between 85 and 100. The percentage of lambs fat off the mothers varies from about 35 to 45 and in some cases a few of the Romney-cross lambs are kept for flock replacements.

On the upper areas Corriedale or half-bred flocks are run with rams of the same breed. Replacements are generally bred on the farm. From Corriedale flocks in the upper area of Okuku top-price clips have been produced consistently for many years. Lambing is timed for October-November to avoid the spells of cold weather which may strike the area earlier and because growth comes away late. A few lambs are fattened off the mothers and others may be kept for sale as hoggets, depending on the feed position. Year-to-year variations in weather influence to a large extent the production of fodder crops, which in turn causes fluctuations in fattening programmes.

3. Semi-extensive Grazing

A large part of the front country of the county is on strongly rolling land, moderately hilly in many places. A block of this country runs from the Ashley State Forest round to the Glentui area, fronting Mt. Karetu and

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[*V. C. Browne photo.*

There are about 290 acres in orchards at Loburn, which produce a considerable part of the apples and pears grown in Canterbury.

Mt. Thomas and bordering the arable downlands.

Sizes of holdings vary considerably, the majority of farms ranging from 900 to 3000 acres. A few large blocks are farmed in conjunction with hill country, smaller areas are used by the more intensive fat-lamb farmers, and in the Loburn-Whiterock area a few holdings as small as 300 to 400 acres are farmed. Carrying capacity per acre varies from 1 to 1¾ sheep, depending on the type of land and vegetative cover and the farming practices adopted. The heavily gorse-infested, light browntop pastures of the east and north-east areas carry less stock than the denser pastures fronting Mt. Thomas, though here also gorse is slowly gaining a hold.

The products from semi-intensive grazing are wool, some fat lambs, store lambs, store sheep, and a few fat cattle.

Pastures are low producing and predominantly browntop, sweet vernal, hard tussock, and some danthonia. West of the Okuku River native tussock grasses contribute to the vegetative cover, and under less droughty conditions nearer the hills growth is fairly dense, particularly below Mt. Thomas, where fattening of beef cattle is a feature of farming.

Surface sowing of cocksfoot, dogstail, and clovers has been adopted in several cases.

The control of gorse and manuka scrub is a major problem on all this land. Burning without subsequent working or surface sowing provides only a temporary check to second growth, and flocks can be grazed on the young gorse only until it again takes control. Beef cattle thrive on most of the deteriorated land and have been found useful for checking rough growth, provided stocking is sufficiently heavy, but in many cases fencing is inadequate to permit this.

Throughout most of this country there are hollows with small areas of moderately fertile arable land suitable for fodder cropping, which can materially affect the value of the whole farm and its carrying capacity. Where fodder-cropping land is available most of the area goes into turnips and grass or oats for winter feed to increase the number of ewes carried, and in most cases sufficient rape is sown to get some of the lambs away fat. Part of the land may be grassed for finishing-off paddocks and to provide a hay crop to supplement winter feed. Lucerne is rare, though outstanding yields have been obtained from an old stand in the area west of the Garry River.

Flock management is in some respects similar to that on hill-country, half-bred ewes and rams now predominating. On the more hilly parts of the downlands there are lamb losses each year due to exposure and on the poorer country a lambing percentage of 80 to 85 is considered a good average. Variations are closely related to the amount of winter fodder provided. Lambs appear about October and are generally weaned about January. Because of fluctuations in fodder-crop yields, lambs are not fattened, but are retained for sale as hoggets or as 2-tooth ewes to fat-lamb farmers for flock replacements.

Under present conditions much of the area is being well managed, though there is a need for more vigorous attack upon the spread of gorse and manuka, and the adoption of "fire-stick" farming methods does not provide the solution. Lack of labour is a severe handicap.

4. Extensive Grazing

The hill country covers an area of about 132,000 acres, or two-thirds of the area of the county, including 26,600 acres of native forest reserves, the rugged mountainous land of the Okuku, Blowhard, and Pancake Ranges, the area of broken foothills running west and north-west from Mt. Thomas, and the valley basins of the south branch of the Waipara River and the upper Ashley and Okuku Rivers. In Lees Valley cold, hard conditions arise from the funnelling into the valley of both north and south winds, which make the high-country portions unsafe winter country and cause serious drying out in summer, but otherwise the valley basins are warm, sheltered country, ranging in altitude from 1200 to 2000ft. The mountain peaks and ranges vary from 2500 to 5000ft. The shelter afforded by the higher ranges further inland is of some value to the hill country of the county, and feed growth and the degree of snow risk are determined not so much by altitude as by aspect.

In the northern section of the county there is an area where conditions, except in size of holdings, are typical of South Island high country. Problems connected with farming this land are not those usually associated with high country, but have arisen through too-close subdivision. Elsewhere on the extensive grazing lands conditions are not typical of high country; snow risk is light and feed growth is better than is usual.

On the shady faces and drier ridges tussock growth is thin and confined to stunted silver and hard tussocks. On the warmer faces and valley basins silver and hard tussocks are more dense and prolific and blue tussocks and snowgrass appear in places, sometimes with browntop and danthonia.

Cocksfoot, dogstail, and clovers introduced by surface sowing thrive. A portion of the Okuku basin which was surface sown with cocksfoot many years ago yields particularly good growth. Indiscriminate destruction of tussock grass by burning as occurred in the past is no longer a feature of hill-country management. Small blocks at a time only are burnt, and the work is done in late autumn not more than once every 3 or 4 years. The close attention hill-country men are now giving to vegetation growth, hill pastures, and erosion problems is reflected in many changes in management—more careful grazing, introduction on a larger scale of beef cattle for control of rough growth, surface sowing of suitable areas, and more careful stocking to improve fleece weights.

Flock management: Half-bred ewes predominate in the hill country. Lambing occurs in October, the most sheltered blocks being used. After lambs have been weaned flock replacements are selected, and the remainder in most cases are sold as store lambs. The severity of the winters, the nature of the land, and the growth of the tussock directly affect lambing percentages, which on warm, sheltered blocks may average as high as 85 per cent. in good years; but in some cases in winters when there are heavy snowfalls, such as have occurred during the last 10 years, lambing percentages have fallen to 65 to 70. On the colder, harder country 75 per cent. is considered a good average.

Of very great significance in the case of a few hill-country holdings is the farming of the land in conjunction with a block of 300 acres or more of arable front country for wintering hoggets and fattening a good percentage of the lambs and cast-for-age ewes. The front blocks are cultivated for rape, chou moellier, oats, or barley as fattening feed, and lucerne and pasture have also been established.

Products from the extensive grazing country in order of importance comprise wool, store lambs, store sheep, and some fat and store cattle.

Farming conditions have since the early 1920's remained relatively stable —few changes of ownership, no marked deterioration in the land, and stability in sheep numbers carried. Productive capacity, however, has been increased by the substitution of breeding ewes for dry sheep, which occurred to a marked extent in the depression of the 1930's, when wool prices were low.

Dairy Cattle

The nature of the soils, severity of climate compared with areas nearer the coast, and the fact that Ashley County is "off the beaten track" all tend to restrict dairying to the supply of household requirements. However, since the development in Christchurch in recent years of a large dairy factory with a wide field of supply, small quantities of cream have been collected from a number of farmers in the Loburn area each with about 3 to 5 cows.

Beef Cattle

Beef cattle, predominantly Polled Angus or Polled Angus-Hereford cross, are now run in herds of 50 to 100 on some of the hill-country farms to check rough growth, and in the sheltered river basins feed growth is adequate for fattening. This practice, however, was not general 15 to 20 years ago, and for some years lack of finance and losses from tutu poisoning retarded the establishment of herds. The wet conditions at the foot of Mt. Thomas provide excellent growth for fattening of beef cattle, and herds have been increased there.

TABLE 4—CATTLE NUMBERS IN ASHLEY COUNTY, 1930-1950

Year	Milking cows	Total cattle
1930	429	1,114
1935	545	1,562
1940	523	1,796
1945	402	1,972
1950	400	2,150

Fruit Farming

Orchards established in Loburn under the Ivory-Acland scheme*, in 1914-15, have produced good apples, pears, and stone fruit for many years. Severe setbacks arise mainly from weather conditions; for instance, in 1935 heavy frost destroyed much of the crop, in 1937 and in 1943 hailstorms caused considerable damage, and frequently there is some loss of fruit caused by the gusty "north-westers". A feature of the orchards is the excellent shelter.

Each orchard is approximately 10 acres, and about 30 growers, occupying 290 acres, produce over 35 per cent. of the total Canterbury production of apples, pears, and stone fruits. The stone fruit crop comprises peaches, nectarines, and a few plums.

The health and vigour of the trees are fairly good, but the difficulties of draining this stiff clay subsoil and the severity of the weather tend to shorten the productive life of trees.

Beekeeping, Poultry, Flax

Beekeeping in Ashley County is confined to domestic and semi-commercial production. Domestic apiaries produce annually about 1250lb. of honey, mainly consumed or sold locally, from the orchard and clover areas of Loburn and Okuku.

In the beech forests and manuka-covered slopes and river-bed areas of Mt. Thomas and Glentui there are some commercial apiaries for the production of feed honey for use mainly in the Rangiora district.

Poultry keeping is mainly a small-scale, side-line occupation of the smallholders, orchardists, and wives or families of farmers in the county. There are approximately 35 flocks and three-quarters of these are under 300.

Flax (phormium) cutting in the swamp area below Mt. Thomas and in other parts of the county at one time provided one of the main sources of supply for the flax mill at Waikuku, but toward the latter years of the depression of the 1930's the Okuku swamp area was heavily cut and has not recovered; the small quantity of flax which continues to be produced comes from south Loburn.

Forestry

There are some 25,600 acres or 13 per cent. of the area of the county in forest reserves, predominantly of black beech (*Nothofagus solandri*); they are in the high-rainfall catchment-basin areas and are useful for soil conservation.

Ashley State Forest Plantation was established in 1939-40 on 5000 acres of the deteriorated clay down east of the Makerikeri River. Plantings are mainly of *Pinus radiata* and Corsican pine, but on the sunny, sheltered slopes some oregon, larch, and Douglas fir have been planted. Trees will reach maturity about 1980, but the yield is not expected to be very high, because although the health and vigour of most of the species are good, the rate of growth is affected to a large extent by exposure to severe weather and the extremely poor soil.

Farming Prospects

Progressive improvement in farming in Ashley County dates from as recently as 10 to 15 years ago, when more attention began to be given to pastures, fodder production, and flock management, but probably the major factor in assisting to restore soil fertility has been the restriction of cereal crop production to its proper place in a rotation suited to the land.

Much remains to be done, particularly in the restoration of some of the depleted down country, but the faults of the past are now recognised and there is reason to be hopeful about the future.

Book Reviews

"Modern Pig Breeding": J. A. Greenslade

MR. GREENSLADE'S book aims at being a practical treatise on pig production for English farmers. For New Zealand readers there are points of direct application in the sections on market requirements, breeds, and breeding management.

The rest of the book, dealing with management to weaning, foods and feeding, diseases, home curing, and British pig clubs, has only a few points which are directly applicable in New Zealand. The requirement of the New Zealand producer for a practical handbook on pig production is already well filled by C. P. McMeekan's "Pig Production", and the book under review therefore will be of little practical value in New Zealand.

—*A.L.*

C. Arthur Pearson Ltd., Tower House, Southampton St., London WC2. 15s. net.

"Pinus Radiata": Dominion Forest Owners' Federation. This booklet describes the utilisation of *Pinus radiata* in industry today, the correct methods of handling the timber, and the grading of it.

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* Under the scheme Messrs. Ivory and Acland undertook the purchase, subdivision, fencing, and planting of the land; the orchards when productive were then sold for settlement.

Provision Should be Made for Winter Greens in the Home Garden in December

By C. L. NAPIER, Horticultural Instructor, Department of Agriculture, Hastings

WORK in the home garden during December is important, as this is the time for planning and planting to provide autumn and winter greens. Current crops will also require continual attention if they are to be brought to successful maturity. To provide the best conditions possible for these crops weeds should be destroyed in the seedling stages and water should be applied if conditions are dry. In well-planned gardens plots should be available for successional sowings of beans, beetroot, lettuces, peas, and other quick-maturing crops.

ALTHOUGH December brings holidays, work should not slacken until all important tasks have been completed. If major tasks are carried out during the earlier part of the month, crops should carry through with little attention until the new year.

Weed Control

The effect of uncontrolled weed growth in vegetable crops is greater than many realise. Weeds compete with crops for moisture, food, light, and air. They are often the hosts of plant diseases such as viruses and fungi and insects such as aphides. If allowed to remain in the garden, weeds can therefore affect the health of and returns from a crop. Summer cultivation in any garden should have as its main purpose the destruction of weeds and be done when the weeds are very young. If left to seed, weeds are perpetuated, are often more difficult to kill, and reduce the amount of plant food and moisture available for the vegetables. If weeds are attacked when young, cultivating implements do not need to be pushed into the soil far. This reduces the risk of damage to roots of shallow-growing crops. All cultivation for weed control is best carried out during warm, sunny weather, when seedlings will quickly wilt and die.

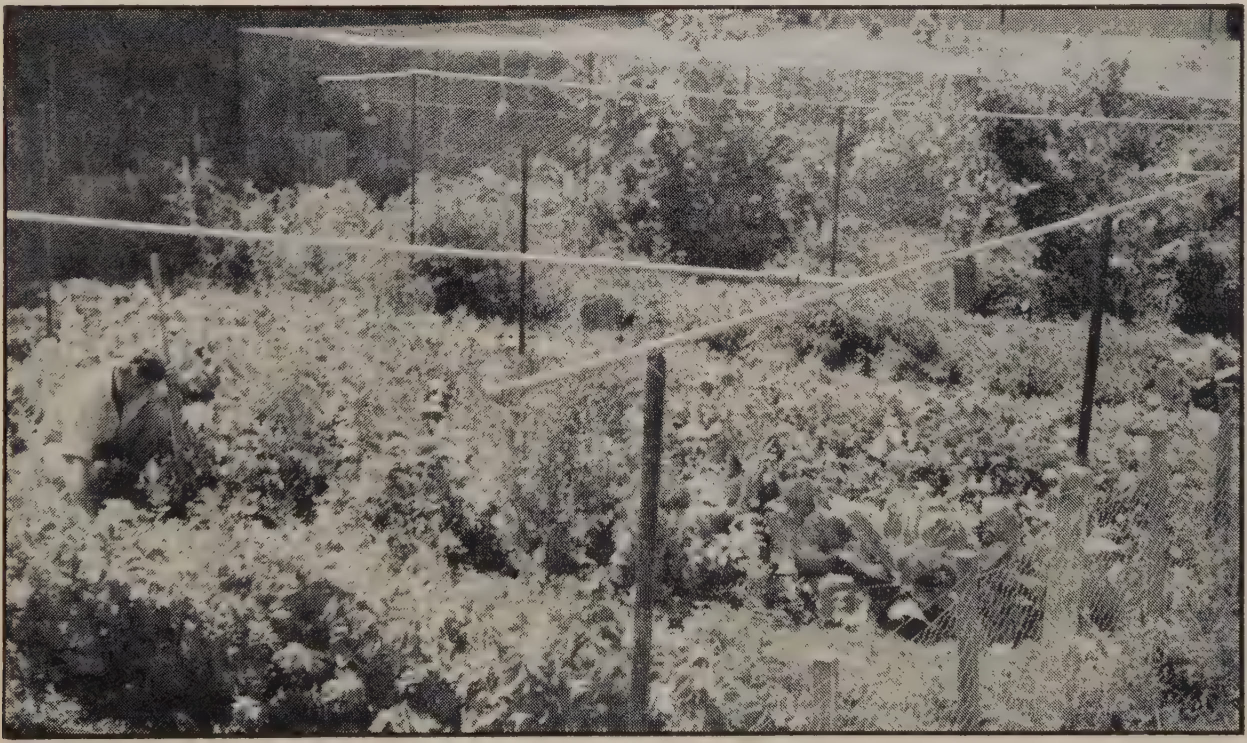
All hoeing or other types of cultivation should be done carefully to avoid damage to growing crops. Roots and stems are easily cut and damaged and such injuries allow entry of disease organisms such as bacteria and fungi. Damaged onion bulbs have their storage quality reduced and any plant if damaged, even slightly, may have its growth checked.

Extent of Surface Cultivation

How much surface cultivation is necessary is a question often asked, but a complete answer cannot yet be given, though some advantages of cultivation are obvious. Apart from weed control the chief advantage claimed is the conservation of moisture. The reduction of weed growth would of course prevent a certain amount of water loss from the soil through transpiration and this could be an important factor during summer. However, it is claimed that by cultivating to keep a dry soil mulch on the surface much moisture loss is prevented through evaporation. Overseas experiments have proved this, but other experiments have shown that a firm soil surface, provided it is dry, will also check moisture loss.

All plants require oxygen to survive. This applies equally to roots as to other parts of the plant. Cultivation can assist by keeping the soil surface open and allowing air to enter. The circulating air also assists in providing the necessary conditions for the soil organisms essential to plant life.

It has been said that cultivation helps to raise the soil temperature, but trials in some countries have shown the reverse. This aspect is probably unimportant, and cultivation on this account hardly seems justified.



This fixed overhead watering system is suitable for larger gardens where water supplies are adequate. The whole garden can be irrigated at one time. Lawn sprinklers and ¾in. pipe were used.

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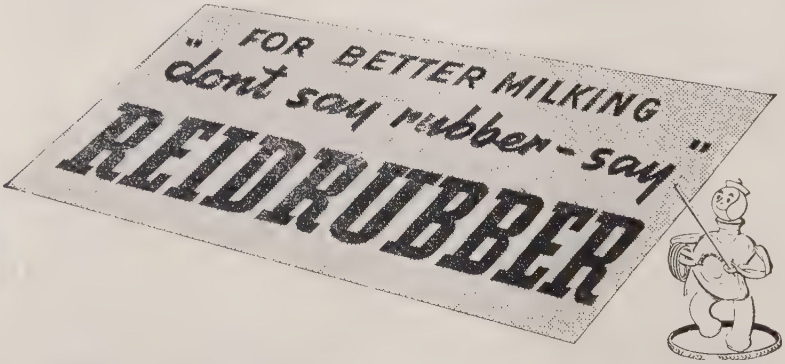

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To sum up it can be said that cultivation should be carried out for the following reasons:—

1. To kill weeds.
2. To keep the surface open and dry and thus reduce water loss. (Cultivation in both these instances would probably be best done shortly after rain or watering, provided soil conditions are satisfactory.)
3. To increase aeration. This practice can be overdone, because if moisture is present, aeration causes rapid breakdown of organic matter in the soil.

Other than to kill weeds and keep the soil surface loose, cultivation should seldom be necessary.

Cultivating Implements

A range of suitable implements was illustrated in the home garden notes on page 309 of the April "Journal". Push hoes of the Dutch and fishtail (torpedo) types are very effective for eliminating young weeds. Draw or chop hoes may be necessary after heavy rain when the soil surface requires loosening. This type should be used carefully near shallow-rooted crops so that roots are not damaged. Wheeled cultivators with detachable implements (including hoe blades, scarifiers, and mouldboard) save a great deal of hand work in the garden. In many types of soils weed control and cultivation can be done efficiently with scarifiers.

[*R. W. Orr photo.*

Mulches of straw (left) and dry grass clippings (right) assist in conserving valuable moisture.

Mulching

The practice of keeping the soil surface loose and dry is often termed dry-soil mulching. Mulching with organic material has already been referred to (the March 1952 issue of the "Journal") as a means of improving soil texture. Mulching also has value in weed control. The application of compost, sawdust, straw, hay, or dry lawn clippings, for instance, will tend to prevent the germination of many weed seeds. Mulches are best applied immediately after a cultivation to kill young weeds, but should not be applied to dry soil. They are best applied to moist soil either after rain or irrigation. Where possible mulches should be applied before dry conditions set in, but the soil should be warm.

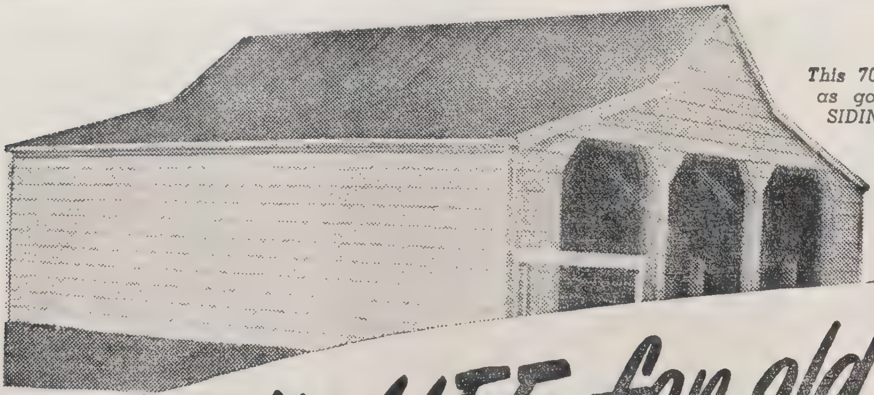
Surface mulches of organic material have many other advantages. For shallow-rooted crops particularly they make soil conditions more even. They assist in keeping the soil cool during the hot summer months and reduce water loss and root damage caused by high temperatures.

A loose mulch can act in a similar way to a soil mulch in conserving moisture. Moisture comes right to the soil surface when soil is mulched this way and this can be an asset with shallow-rooted plants. As this may not encourage plant roots to go deep, the mulch must be retained through the warmer months; otherwise wilting may result.

Mulching should be practised with caution for at least two reasons. If too thick, it will reduce the beneficial effect of light showers by preventing the water reaching the soil. In districts where fairly adequate quantities of rain may be experienced throughout summer mulches can keep a soil too wet. Most vegetables can be mulched, but beans, peas, tomatoes, celery, and young vine crops benefit most from this practice.

[*Green and Hahn Photography Ltd. photo.*

The Dutch hoe gives good control of young weeds, which, if disturbed, quickly wilt in warm weather.



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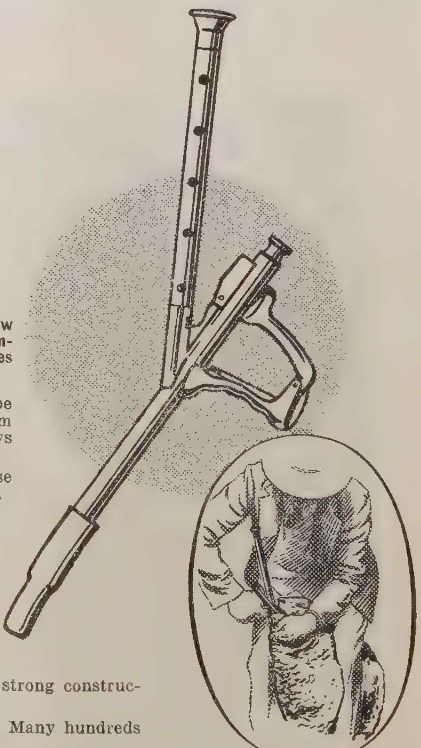

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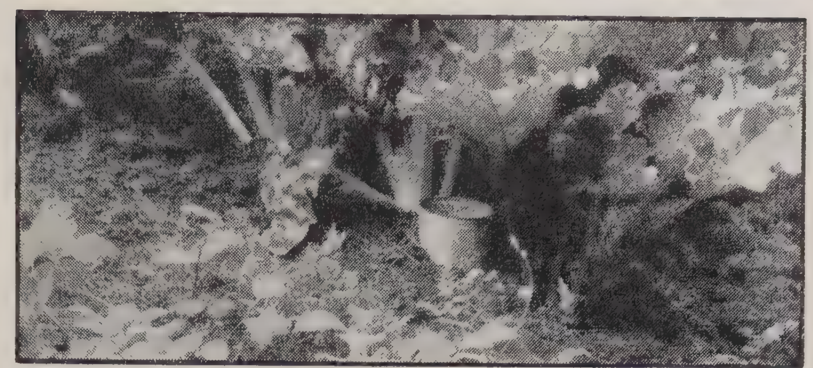
Although cultivation and mulching assist in moisture retention, the application of water is sometimes necessary if crops are to survive. The advantages of irrigation are varied: Plant growth is not checked in dry weather and crops therefore reach maturity more quickly, quality is better, yields are often greater, and sowing and planting can take place at almost any time. Light soils are fairly porous and a large volume of water can be taken up by them without adverse effects, but application to heavy soils needs to be done carefully to avoid waterlogging. The heavier crops resulting from irrigation tend to use up soil organic matter more quickly than would otherwise be the case. Irrigation can bring about an increased incidence of diseases which flourish under the humid conditions.


[*Photo News Ltd. photo.*

The bottomless tin beside this rhubarb is effective for directing water to the crop; the method can be used for vines and tomatoes also.

Light Sprinklings Wasteful

When watering, many gardeners attempt to cover too much of the garden with the water available and so do not do a thorough job. This is no doubt partly because of many local water restrictions. Light sprinklings result in a waste of water and the gardener's time and are rarely beneficial to the plants.

Gardens are usually watered in the evening on the assumption that the water will soak in overnight. Soil temperatures even at this time are usually fairly high, and light sprinklings of water are quickly lost by evaporation. Even if the water soaked in ½in., it would be of little use to any plants but seedlings. To be of value water must soak in at least 4in., preferably more. Besides reaching the root zone of most plants, water at this depth is not so likely to be lost by evaporation. If water is applied in quantity so that it reaches the lower depths, it does not need to be applied so often. Thorough watering can take less time than light sprinklings of the whole garden. If watering is done regularly, gardeners can thoroughly water a portion of the garden each day or at intervals of a few days if they have only a small plot.

Once the soil is thoroughly moistened the aim should be to apply about 1in. of water to the whole garden each week. This is equivalent to about 800 gallons on a 30 x 50ft. plot. Of course soil type must be considered, as light soils may need more and heavy soils less. The amount of organic matter in the soil will also affect application. If the garden is divided up so that a particular crop or group of crops is watered each time, better results will be obtained. Small seedlings, moisture-loving plants such as leaf vegetables, or the more shallow-rooted plants may need water more often than other types.

As crops mature watering of some must be done with care. Potatoes for instance may start into second growth if they receive too much water. Onions and related crops when mature and drying off should not be watered or their keeping quality will be impaired. Consistent watering can encourage foliage diseases of many vegetables, including potatoes, beans, celery, and tomatoes, particularly if done from overhead.

Methods of Irrigation

Although there are a number of methods of irrigating crops, the two most suited to home garden conditions are the furrow and overhead methods.

Furrow irrigation is no doubt the cheapest method, as very little equipment is needed. In some countries such as the U.S.A. this method is used extensively with good results. Furrows are drawn between rows of plants to be watered and water is allowed to run until the soil throughout the length of the furrows is saturated. This method has its disadvantages on some soils. On light, sandy soils, for instance, drainage at the inflow end of the furrow may be so great that the far end obtains little water. On heavy soils the opposite may occur and even a little water may cause the soil to become flooded and puggy in spots.

[*Green and Hahn Photography Ltd. photo.*.

The rose on this hose provides a fine overhead spray. The hose should be held as illustrated some distance from the plants to avoid washing of the soil.

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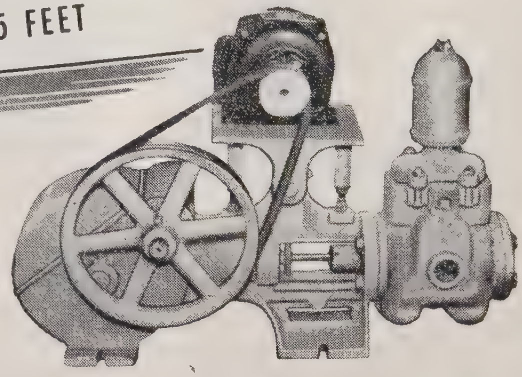

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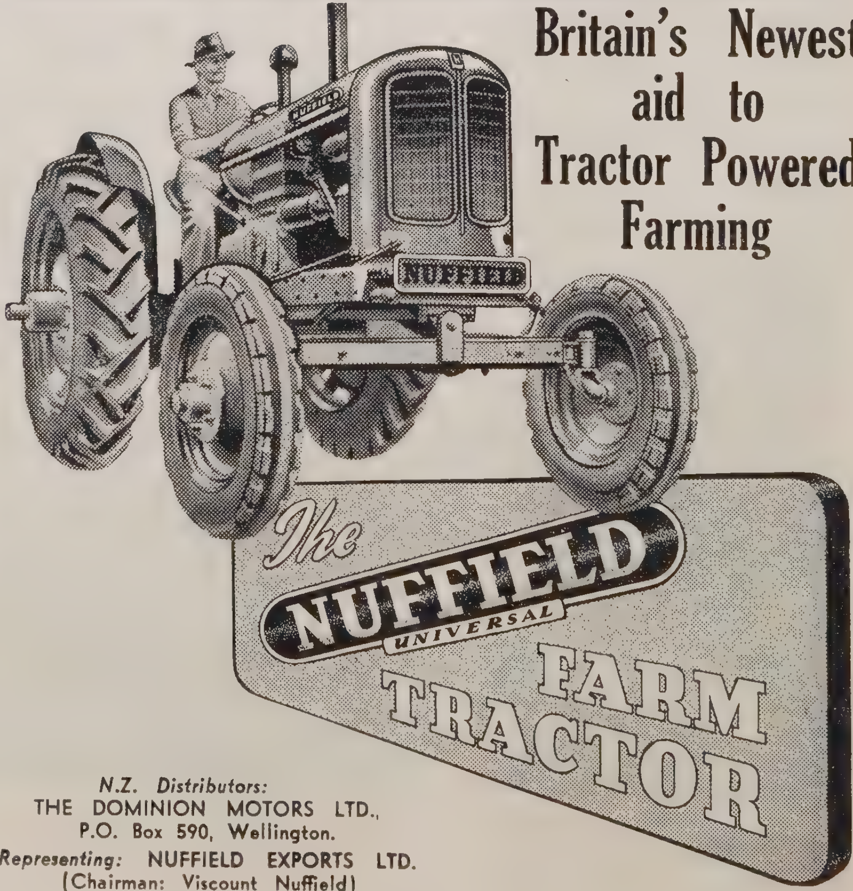
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Sloping soils can assist the flow of water in furrow irrigation, but the volume must be controlled carefully so that no great amount runs off. It should be sufficient to allow a gentle flow and slow soaking into the soil.

The simplest method is to draw shallow drills between rows and, if necessary, connect them with a further drill running across one end of the plot. A hose can be placed in this end drill and left until the soil is soaked throughout the whole system. As an alternative to the end connecting drill an old garden hose can be used. Holes can be pierced in it at intervals to coincide with the distance apart of the drills in the rows. Several rows can then be watered at once. If a length of water piping is available this can be used in place of the hose. V-shaped holes can be cut along one side with a hacksaw at the required intervals.

Flooding by running water over the surface may also be possible on some soils, but there is more danger of soil becoming waterlogged. If the soil surface is not perfectly level or is very open, flooding or even furrow irrigation may be very difficult.

Overhead irrigation is without doubt the most widely used method of watering gardens. The appliances available are varied, but in areas where restrictions operate, hoses with or without roses attached are all that is necessary, because in many areas the hose must be held in the hand. Sprinklers are used to a great extent by home gardeners and make the best job of applying water compared with other methods. On average soils it is possible to obtain a more even distribution of water with sprinklers and water does not tend to lie in pools as it does with flooding.

Other advantages of overhead irrigation are that very uneven or sloping soils can be watered much better, a more even distribution is obtained on very porous soils, and the method as a whole requires less time and labour than other methods.

Overhead watering has often been said to encourage plant diseases. This is possible, but if it is practised judiciously, it should not have any serious disadvantage. Bacterial diseases of beans, blights of tomatoes and potatoes, and club root of brassicas are a few diseases that may be encouraged.

Perhaps the two most popular sprinklers are the rotary and cone types. The cone sprinkler is usually made of heavy sheet metal and does not rotate but throws up a fine mist of spray like an inverted cone. Rotary sprinklers usually cover a greater area and large commercial models water up to several acres at a time. Some type of stand to lift sprinklers above vegetables closely grown (the usual practice in home gardens) is an advantage. A large outlay for irrigation is not necessary, as garden hose can be purchased for 1s. 2d. to 1s. 8d. per foot and sprinklers for 2s. 6d. to £5 each.

Sub-irrigation: The practice of watering plants from beneath the soil has been adopted for outdoor crops overseas and for plants under glass in New Zealand. The method usually incorporates a system of field pipes through which the water runs to seep through the gaps between the pipes into the soil. This method operates successfully only with special types of soil.

[*Green and Hahn Photography Ltd. photo.*

Winter crops (such as the celery shown) should be sown or planted this month in most districts if they are to reach maturity in time.

A form of sub-irrigation is illustrated in this article. Tins with the bottoms removed or pierced are set in the soil in the vicinity of plants as shown. The tins can be filled with water, which will gradually soak into the soil about the roots. The tin method can be used with success on slopes (tins should be inserted on the high side of plants) and for watering the "softer" plants such as marrows and other vine crops. Tins can be set conveniently in the centre of hills before vines are sown and refilled regularly during dry weather.

Other Work for December

Although the season will be far advanced in many districts, sowing and planting of many crops, especially for winter supply of greens, can still be done. If this work is neglected now, the chance of having a cheap supply of fresh vegetables during winter will be lost.

Provided conditions are satisfactory, successional plantings of vegetables such as beans, beet, lettuce, and other salad vegetables can still be made. In many districts sowing of quick-maturing vegetables such as radishes can be made between slower-maturing crops. Where close intercropping is practised gardeners should not lose sight of the possible need for extra plant foods to meet the increased demand.

Winter Greens

Greens are important at any time of year, but perhaps more so during winter. During December gardeners should sow and plant the main greens—silver beet, savoy cabbage, cauliflowers, including the winter strains (broccoli), brussels sprouts, and kale (borecole). All these require rich, well-drained soils for successful growth. Addition of animal manures and straw a few weeks before planting or well-rotted manure or compost to areas to be planted immediately is advisable. Additional fertilisers may also be necessary on some soils.

Planting should not be done under drought conditions. The soil should first be watered and planted when the surface soil has dried 2 or 3 days later. As with all warm-weather planting, setting out is best done before or shortly after rain. All seedlings should be well watered some hours before lifting and immediately after plunged into a clay and water mixture the consistency of porridge to keep the roots from drying out. All seedlings are best planted out as soon as they are large enough to handle easily. If seedlings are left too long, the roots are more liable to damage and the large leaf areas tend to give off larger amounts of moisture than the reduced root system can take up and wilting results.

Silver beet is best sown as thinly as possible in its permanent position. Any seedlings available now can be set out from 8 to 12in. apart. Thinnings from seed sown this month can be treated likewise later. The roots should be damaged as little as possible. Giant Broad White Rib is a good variety. Rhubarb Chard is novel in having red veins.

Winter cabbage (savoys): Sowings should be made immediately if this has not already been done. Seed-beds should be on the flat and kept moist throughout the germinating period. If land is available, one or two seeds

[*R. W. Orr photo.*

Beetroot is delicious if pulled at this stage, but these plants are too close for good-shaped roots to develop.

can be dropped at intervals along the row in the permanent site for the cabbages. Direct sowing tends to give a slightly earlier crop.

Planting out of earlier-sown cabbage plants can be done now. Suggested distances are 24 to 30in. between rows and 18 to 24in. between plants. Varieties recommended are: North Island: Golden Acre and Green Acre. South Island: Omega and Drumhead.

Red or pickling cabbage should be set out without delay, as it is fairly slow maturing. This type is only a selection of the ordinary cabbage and requires exactly the same conditions. It can be used for pickling or ordinary table purposes.

Broccoli: The last sowings should be made immediately and the first plants set out this month. Spacing as for savoys can be used for this vegetable. In the North Island Roscoff and Phenomenal strains are suitable and in the South Island Snows Improved, Lily White, and Veitches Self-protecting with Roscoff strains for early maturing.

Cauliflowers: Plantings of the following varieties can take place now: North Island: Early London, Phenomenal Early. South Island: Early London, Walcheren, Phenomenal strains.

Brussels sprouts are fairly difficult to bring to maturity in good condition. They do better in the cooler districts. In warmer areas they not only make poorer growth, but often become badly infested with grey cabbage aphis. However, the gardener who can grow brussels sprouts successfully is richly rewarded. Planting distances can be similar to those for savoys. Fillbasket and Scrymgers Giant are good varieties.

Kale or borecole can be boiled like cabbage or used in salads when young. Its cultivation is similar to that for brussels sprouts. Gardeners should choose strains with care, as some are not as palatable as others. Asparagus kale, fine-curled strains, and Scotch kale should all find favour.

Salad Crops

In summer a number of kinds of vegetables are in demand for salads.

Lettuces are best sown in situ at this time of the year, as a check is likely to result from transplanting. They should be sown as thinly as possible and any thinnings, which will reach maturity later than the plants that remain, planted out carefully. Great Lakes is perhaps the best summer variety, and plants should stand about 8in. to 12in. apart in the row.

Radishes are very quick maturing and can be sown with many other slower-maturing vegetables. They can be sown in the rows with lettuces, carrots, or red beet or in small beds in a corner. Small quantities sown often ensure regular supplies of fresh, crisp roots. Long Scarlet is a good variety.

Mustard and cress are two greens that can be used in salads or even sandwiches. They are grown quickly and are best sown in small lots at frequent intervals. Both greens are cut in the seed-leaf stage and as cress grows a little more slowly than mustard, it should be sown slightly earlier. Both can still be sown in beds in odd corners or in boxes that can be moved easily. Cutting can be done with scissors when the plants are about 2in. high.

Tomatoes form a valuable portion of present-day diet. Late plantings can be made if autumn conditions are mild. Cloches will assist in lengthening the season still further. In the drier districts dwarf varieties may be preferred to tall varieties. The former require more space, but usually yield good crops. Tatinta and Tatura are good smooth varieties of dwarfs and Potentate, Sunrise, and Stoners Prolific good-cropping tall varieties. The fruit of the last is of medium size and is very suitable for preserving whole.

Root Crops

Carrots can be sown this month for main winter crops. In districts where carrot rust fly is a problem December sowings are often successful, as they tend to miss the heavy attacks. Chantenay and Manchester Table are good varieties, and as roots of the latter have blunt ends, less is wasted during preparation. Seed should be sown about ½in. deep if conditions are dry, in rows 12in. apart.

Parsnips for main crops should have been sown by now in most districts, although sowings can still be made where there is a long growing season. Hollow Crown and Student are good varieties and can be sown thinly in rows 12 to 18in. apart. These seeds often germinate poorly in dry weather and precautions should be taken to ensure supplies of moisture. Well-ripened seed should be sown to ensure satisfactory germination.

Beetroot is a crop that grows best under moist conditions and fairly high temperatures. Beet is best used before it reaches maturity. Sowings should be made thinly and plants allowed to grow at least 2in. apart. Varieties Crimson Globe and Detroit Dark Red are very popular and the long type Long Dark Blood is very good also.

Turnips are of two types, the well-known white turnips and swede turnips. Turnips grow fairly well throughout summer provided moisture is adequate. Swedes on the other hand do better in the cooler districts, and as they normally require a longer growing season than turnips, should be sown fairly early to obtain good-sized roots. Turnips sown now will give good results. Golden Ball and Early White Milan are recommended varieties, the former tending to stand well if not pulled as soon as ready.

Celery, leeks, all vine crops, and sweet corn should be sown without delay and sowings made of parsley, peas, kohl rabi, and spinach.

Plantings can include potatoes (quick-maturing varieties), vine crops, late kumara crops, and spinach beet.

All successional sowings of crops should be thinned where necessary and rows watered afterward to counteract any root damage. Maturing crops such as beans, peas, tomatoes, and cucumbers should be harvested regularly to lengthen the production life of the plants. All leaf vegetables benefit from waterings of liquid manures, which are best applied after the soil has been moistened. Kumara runners should be lifted to prevent them rooting.

Onion crops should be tended carefully to prevent damage to the bulbs and earlier-planted potatoes moulded up well to guard against tuber moth attack. Tall tomatoes require constant attention. They should be tied securely and all growth from leaf axils should be rubbed off when not longer than 2 to 3in. Cutting of asparagus should have been completed by now and beds should be cleaned up and manured or topdressed with compost so that food supplies will be stored in the roots for next season.

A strict watch should be kept for pests and diseases and immediate steps taken to eliminate them. The harvesting of mature crops, watering of crops if the soil is dry, spraying of susceptible crops with insecticides and fungicides, and a final cultivation just before the holidays should assist in keeping the garden in order until the new year.

Increasing the Number of Colonies in an Apiary

Seasonal Notes for the Domestic Beekeeper

IF the weather has been favourable during October, colonies will now be populous and no doubt some domestic beekeepers will be wondering how they may increase the number of colonies from the bees on hand without having to buy new hives of bees. In this article T. P. J. Williams, Apiary Instructor, Department of Agriculture, Hamilton, describes various methods by which an increase may be accomplished.

NATURAL increase may be obtained by the use of swarms which issue from the hives in the apiary. However, this is most undesirable, as it brings about a division of the working force of the colony. There are far better methods of securing an increase from the bees on hand without relying on swarming. Before making an increase consideration should be given to the prevailing conditions. The hives should be well populated with bees and should contain plenty of brood, the weather will need to be fine and warm, and a source of nectar readily available to the bees. Where there is a dearth of nectar best results would be obtained by feeding the new colonies.

A Simple Method

A simple method having a twofold purpose—securing an increase and providing a means of controlling swarming—is described below.

When it is noticed that the bees have begun building queen cells and are preparing to swarm the hive should be moved on to a new stand a few feet to one side of the original site. The entrance is reversed in the new position so that the bees will then fly from what was the back portion of the hive.

The hive then has to be examined and the queen found and removed together with two or three frames of brood and adhering bees. Two frames containing honey and pollen are also removed and placed in a super on the old stand. The remaining space may be filled up with drawn combs if available; otherwise frames filled with full sheets of foundation will do. With the return of field bees to their old site this hive will be considerably strengthened.

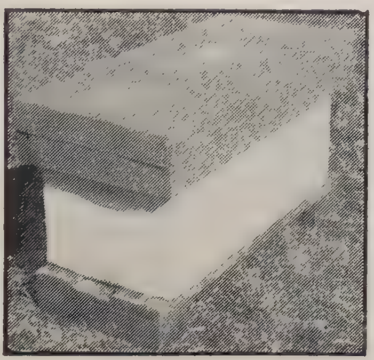
The old hive should then be examined and all queen cells but one destroyed. This hive should be checked again in 3 weeks to see if there is a laying queen present and may then be turned gradually, over a period of a week, to face the right direction. Manipulations in this method are shown in the illustrations below.

Forming Nucleus Colonies

A nucleus box is usually made to hold four or five full-depth frames and has a small entrance for defence against robber bees. After a strong colony containing plenty of brood and bees has been selected the nuclei may be formed by removing two frames of capped brood and adhering bees, care being taken to see that the queen is not with them, and placing them in the nucleus box with a frame containing honey and pollen. It is advisable to place rather more bees into the nuclei than are on the frames, as a loss will occur through the older bees returning to the parent hive. The lid is then placed on the nuclei, the entrance closed with a piece of gauze, and the nucleus hive shifted as far away as possible from the parent hive. These manipulations are best carried out late in the day. After a day the gauze is removed from the entrance and the nuclei are given a ripe queen cell or a young queen is introduced. The bee strength may then be built up steadily by the feeding of sugar syrup.

Larger Increase

Where it is the beekeeper's intention to make a much larger increase than one or two hives the increase will have to be carried out at the expense of the honey crop from the hive to be split up. If the colony to be used for making increase is strong in bees and contains about ten frames of brood, it may be split up into five nuclei, allowing each two frames of brood and a frame of honey and pollen. The entrances to the nucleus colonies should be closed with a piece of gauze for 2 days to accustom them to their new hive. One of the nuclei will contain the queen from the hive that was split up, but the others could be left to rear their own queen or young queens could be introduced. Each nucleus may be helped greatly by giving it additional combs of capped brood whenever there is brood to spare. These nuclei should build up into full colonies by the end of the honey flow.

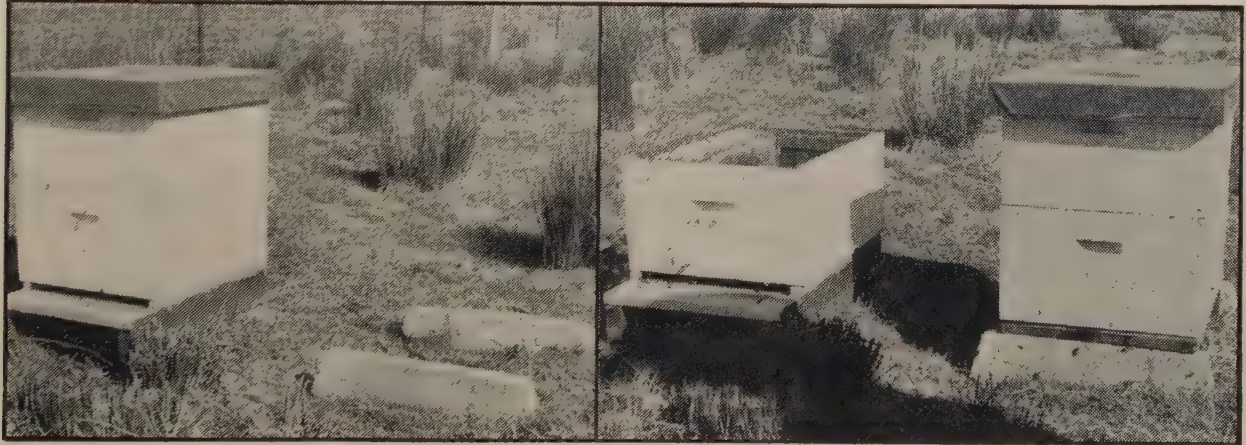


The nucleus hive is a popular method of making an increase.

Hiving a Swarm

A swarm that has been caught and successfully hived will also constitute a new colony and is one method, although not the best, of making an increase.

Bees are usually good natured when swarming and are easily managed. However, they are sometimes hard to catch, depending on where they



A simple method by which an increase is secured and swarming is controlled. Left—The hive is moved on to concrete blocks and the entrance is reversed. Right—The queen is removed from the hive and placed in a super on the old stand.

cluster. If a swarm has settled on a low shrub or limb, it can be obtained without difficulty and shaken into a super of combs or frames of foundation. Taking of a swarm is more difficult when the swarm clusters on a fence post; the best plan then is to brush as many bees as possible into a box, which should then be turned upside down over those which have fallen to the ground. They may then be left until evening, when they can be properly hived. Too often the swarm prefers to settle in a tall tree out of reach. Such a swarm is best secured by using a cloth sack with its mouth sewn to a wire loop and fastened to the end of a pole. The sack is lifted up until it surrounds the swarm, the limb jarred, and the mouth of the sack quickly turned to close the opening. After being lowered to the ground the swarm can be carried in the sack to where it is to be hived.

Extreme care must be exercised when catching stray swarms from an unknown source, as they can quite easily carry disease. The following procedure should therefore be adopted. When a stray swarm has been found shake it into a temporary wooden box and leave the bees there for 2 or 3 days, during which they will have used all of the honey that they carried with them in drawing out new comb. Prepare a hive with frames of foundation and shake the bees out of their box on to a sheet of newspaper spread out in front of the new hive placed next to the box. This should be done as late in the afternoon as possible. The temporary box must then be destroyed, all the comb that has been built being burnt with the newspaper on to which the bees had been shaken. The swarm may have to be fed for a few days, depending on the weather and nectar available.

It is surprising what progress a good swarm will make if it is caught at the beginning of the honey flow; it will usually be quite a strong colony by the end of summer.

◆

Vaccination against Contagious Abortion

APPLICATIONS by farmers for vaccination of their calves against contagious abortion in 1953 are now due. The charge is 2s. per calf irrespective of the number involved. The closing date for applications for dairy calves is 14 January and for beef calves 31 July. A late fee of 10s. is payable on all applications received after these dates.

As in previous years members of veterinary clubs should apply to the secretary of their club, and other farmers should apply to their nearest Livestock Instructor (Inspector of Stock), from whom they can obtain the necessary application forms. Applications to Livestock Instructors must be accompanied by a cash payment calculated on the basis of the charge mentioned above.

It is desirable that applications be sent in as early as possible so that vaccinating officers can arrange the work efficiently. Farmers are therefore requested to forward their applications by 3 January.

◆

A. and P. Show Dates

THE following are the dates and venues of Agricultural and Pastoral Association shows up to 7 March 1953:—

December

*2 and 3 December—Gore A. and P. at Gore.
6 December—Whangaroa A. and P. at Kaeo.
6 December—Hauraki A. and P. at Paeroa.
6 December—Helensville A. and P. at Helensville.
6 December—Wyndham A. and P. at Wyndham.
*9 and 10 December—Southland A. and P. at Invercargill.
13 December—Otago Peninsula A. and P. at Portobello.

January

1 January—Nuhaka A. and P. at Nuhaka.
10 January—Blueskin A. and P. at Waitati.
10 January—Rotorua A. and P. at Rotorua.
16 and 17 January—Wairoa County A. and P. at Wairoa.
17 January—Waikouaiti A. and P. at Waikouaiti.
*24 January—Central Hawkes Bay A. and P. at Waipukurau.
24 January—Palmerston and Waihemo A. and P. at Palmerston.
*27 and 28 January—Feilding A. and P. at Feilding.
*30 and 31 January—Horowhenua A. and P. at Levin.
31 January—Waiau A. and P. at Tuatapere.
31 January—North Kaipara Agricultural Association at Paparoa.

February

2 February—Horowhenua Ram Fair at Levin.
4 February—Marton District A. and P. at Marton.
6 and 7 February—Ohura A., P., H., and I. Association at Nihoniho.
*7 February—Clevedon A. and P. at Clevedon.
7 February—Rodney Agricultural Society at Warkworth.
7 February—Rangitikei A. and P. at Taihape.
7 February—Woodville A. and P. at Woodville.
7 February—Hukerenui A. and P. at Hukerenui.
10 and 11 February—Dannevirke District A. and P. at Dannevirke.
13 February—Dannevirke Ram Fair at Dannevirke.
13 and 14 February—Taranaki Metropolitan A. and P. at New Plymouth.
*13 and 14 February—Taumarunui and District A. and P. at Taumarunui.
*13 and 14 February—Buller A. and P. at Westport.
14 February—Waitemata A. and P. at Waiwera.
14 February—Pahiatua A. and P. at Pahiatua.
14 February—Tauranga A. and P. at Tauranga.
18 February—Te Awamutu A., P., and H. at Te Awamutu.
20 and 21 February—Masterton A. and P. at Masterton.
20 and 21 February—Franklin A. and P. at Pukekohe.
*21 February—Murchison A. and P. at Murchison.
21 February—Northern Wairoa (Arapohue) A. and P. at Mititai.
21 February—Banks Peninsula A. and P. at Little River.
24 February—Otorohanga A. and P. at Otorohanga.
25 February—Opotiki A. and P. at Opotiki.
*27 and 28 February—Wellington and Hutt Valley A. and P. at Upper Hutt.
28 February—Putaruru District A. and P. at Putaruru.
28 February—Waimarino A. P., H., and I. at Raetihi.
28 February—Whakatane and Rangitaiki A. and P. at Whakatane.
28 February—Maniototo A. and P. at Ranfurly.

March

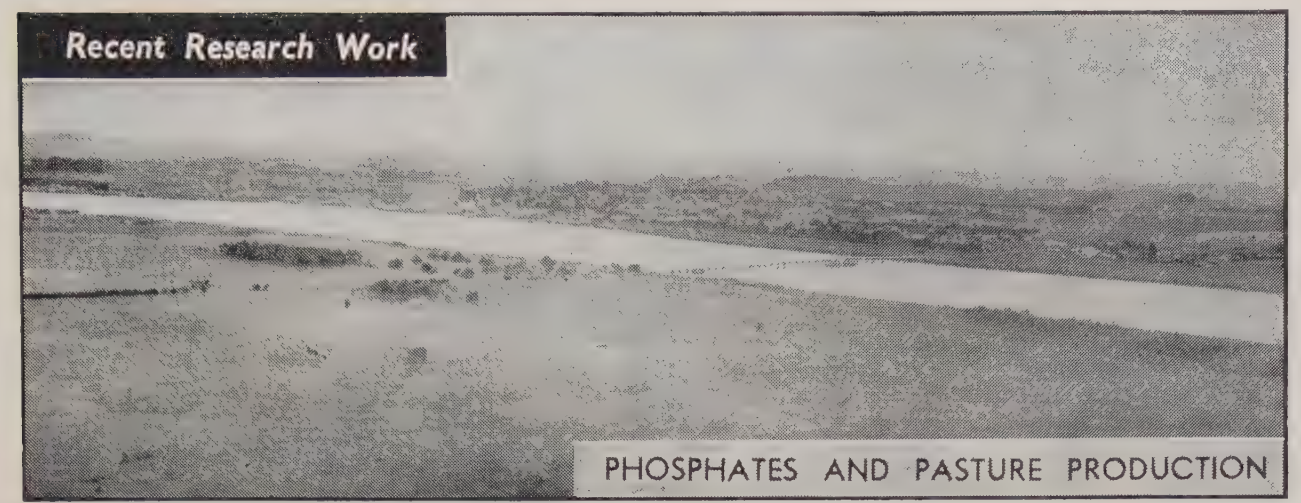
*4 March—Morrinsville A. and P. at Morrinsville.
*6 and 7 March—Te Kuiti and District A. and P. at Te Kuiti.
7 March—Amuri A. and P. at Rotherham.
7 March—Matamata A. and P. at Matamata.
7 March—Waiotira Junction A. and P. at Waiotira.
*7 March—Temuka and Geraldine A. and P. at Winchester.
7 March—Albany A. and P. at Albany.
7 March—Mt. Benger A. and P. at Roxburgh.
7 March—Mangonui County A. and P. at Kaitaia.

* The Department of Agriculture exhibit will be staged at this show.

Meteorological Records for September

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum: Maximum	Absolute maximum and minimum: Minimum	Total fall	No. of days of rain	Difference from normal	Maximum fall: Amount	Maximum fall: Date	
Kerikeri	201	54.2	+ 0.4	72.1	34.5	3.30	14	— 1.84	0.89	11	207.7
Auckland	160	55.6	+ 1.1	70.8	41.7	4.44	12	+ 0.65	1.22	14	173.6
Tauranga	10	53.3	+ 0.8	69.7	31.0	3.63	15	— 0.59	1.07	6	191.8
Ruakura	131	50.6	— 0.3	69.7	26.9	2.55	13	— 1.13	0.70	12	163.7
Rotorua	969	51.6	+ 2.9	69.5	30.6	1.72	12	— 2.85	0.47	12	169.6
Gisborne	12	52.5	— 0.1	71.9	35.9	6.88	17	+ 4.26	1.55	8	171.2
New Plymouth ..	160	52.8	+ 1.1	64.7	36.0	1.76	10	— 3.14	0.39	18	195.4
Napier	5	53.2	+ 1.2	72.9	37.3	4.55	14	+ 2.58	1.97	7	170.5
Karioi	2125	47.2	+ 2.2	67.0	27.0	1.30	9	— 2.97	0.45	24	
Wanganui	72	53.2	+ 1.1	68.8	33.5	1.09	10	— 1.45	0.26	7	178.8
Palmerston North .	110	52.2	+ 1.7	66.8	32.8	0.70	14	— 2.31	0.20	23	143.9
Waingawa	350	50.8	+ 1.5	69.0	30.3	2.11	12	— 1.16	0.41	25	166.5
Wellington	415	51.6	+ 1.7	63.8	38.2	1.74	8	— 2.10	0.97	23	154.3
Nelson	5	49.0	+ 0.8	67.9	31.0	0.52	5	— 2.64	0.23	23	237.2
Blenheim	12	51.6	+ 0.9	72.0	32.1	0.82	5	— 1.46	0.73	23	209.6
Hokitika	12	48.9	+ 1.5	66.4	31.9	4.20	12	— 4.42	1.57	18	201.0
Hanmer	1225	47.7	+ 1.6	69.0	28.5	2.53	10	— 1.90	1.29	23	177.6
Christchurch ..	22	51.4	+ 2.7	73.8	29.6	1.67	6	— 0.39	1.03	23	163.5
Ashburton	323	50.2	+ 2.3	74.8	28.6	1.65	6	— 0.57	1.39	22	180.7
Timaru	56	48.4	+ 0.5	77.9	31.0	1.59	4	— 0.36	1.26	23	161.8
Alexandra	520	49.0	+ 1.9	71.6	26.8	0.84	6	+ 0.02	0.70	22	180.3
Taieri	80	48.4	+ 0.7	71.3	29.1	1.42	11	— 0.51	0.54	22	161.5
Invercargill ..	0	47.3	+ 1.6	65.7	24.8	4.64	15	+ 1.42	1.35	22	157.0

Recent Research Work



PHOSPHATES AND PASTURE PRODUCTION

THE Extension Division of the Department of Agriculture is responsible for the study of soil management problems on all soil types, and increased primary production depends to a large degree on the co-operative efforts of farmers and Instructors in Agriculture in solving local soil fertility problems. The following results of topdressing trials on Kaipara clay soil will be of interest to Northern Wairoa farmers.

KAIPARA CLAY SOIL

KAIPARA clay soil covers about 60,000 acres in the Northern Wairoa district. It is a grey-flecked heavy clay loam and a typical meadow or ground-water soil. The water-table is high and rises to or near the surface during winter. Before stopbanking work was carried out large areas frequently were covered at high tides by the river. If grazed while wet, the soil poaches severely and on drying out in summer it will crack and open up badly if it is not covered with a vigorous, dense pasture sward.

When adequately drained and topdressed and under good pasture management this soil type has produced up to 350lb. of butterfat per acre from perennial ryegrass-paspalum-white clover swards.

OBSERVATIONAL TRIALS

OBSERVATIONAL trials carried out on Kaipara clay soil showed that when spread without lime, superphosphate and ground North African phosphate gave fair responses, serpentine superphosphate gave fair to good responses, and basic slag gave good responses. These phosphates were applied at the rate of 3cwt. per acre annually. The application of ground limestone at 1 ton per acre initially followed by 5cwt. annually increased the responses from superphosphate to good to very good and from serpentine superphosphate and basic slag to very good. No increases in the responses were observed by adding potash to the dressings of phosphates either alone or with lime.

MOWING TRIAL

IN September 1947 a mowing trial was laid down at the Northern Wairoa Experimental and Demonstration Farm on a field which had received regular annual dressings of superphosphate or serpentine superphosphate at 3cwt. for 3 years and 4cwt. for 4 years and of lime at 5cwt. for 6 years. Soil samples were taken in June 1947. In the 0 to 3in. layer the amount of available phosphate was high and in the 3 to 6in. layer there was a medium deposit. The pH was about 5.5, a figure quite compatible with a productive paspalum-ryegrass-white clover sward, but one which would suggest a probable liming response. Annual applications of fertilisers per acre used in the replicated mowing trial were superphosphate 4cwt., 30 per cent. potash salt 2cwt., and lime 1 ton at the beginning of the trial and 5cwt. each subsequent year.

YIELDS OF DRY MATTER

THE yields of dry matter from the plots expressed as the percentage increase over "no manure" treatments were as follows:—

Year	Super.	Super. and lime	Super. and potash	Super., lime, and potash
	Per cent.	Per cent.	Per cent.	Per cent.
1947-48 ..	17	18	16	20
1948-49 ..	8	6	7	15
1949-50 ..	23	29	20	32
1950-51 ..	28	37	29	39

The results show that superphosphate has given a consistent and highly marked response. Lime has given definite responses which have been more marked on plots receiving superphosphate and have increased as the trial progressed. Potash has given very slight responses which occurred mainly in summer. Throughout the trial herbage samples from the no manure and the lime, superphosphate, and potash plots have been analysed. Both paspalum and, more especially, ryegrass have responded to the fertilisers. The response of white clover has been less than expected.

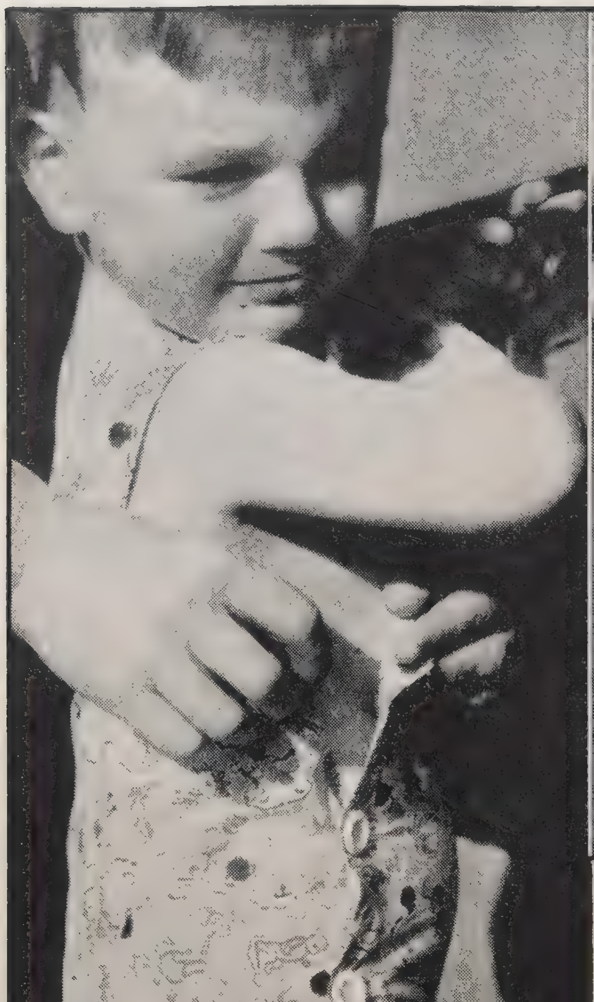
RATES OF PHOSPHATIC TOPDRESSING

THERE is, however, no evidence from this trial to indicate that a lower per-acre dressing than 4cwt. of superphosphate would have given a similar result to that shown above. This suggestion will be examined in a trial recently begun in a neighbouring field, but a summary of some 70 observational trials and 7 mowing trials on various soil types throughout New Zealand suggests that in most districts increasing the rate of application of phosphatic fertilisers to at least 3cwt. per acre gives increased responses. There are many exceptions to this generalisation, however, and one of these appears to be those soils where the available soil phosphorus is already at high levels. This is the case in the trial summarised in this article. A number of accurate trials have been planned to discover the minimum rate of phosphatic dressing required to maintain a high level of pasture production under as many soil types and farming conditions as possible. Until this work produces evidence to the contrary, however, it would be advisable to continue applying phosphatic topdressings at the rates now recommended by field officers of the Department of Agriculture.

FORMS OF PHOSPHATE

ANOTHER replicated mowing trial to compare the value of various phosphatic fertilisers on Kaipara clay has been carried out at the farm. Superphosphate was applied at the rate of 4cwt. per acre and serpentine superphosphate, reverted superphosphate, basic slag, and North African phosphate at rates to give equivalent P_2O_5 to that contained in 4cwt. of superphosphate; in addition North African phosphate and serpentine superphosphate were applied at 4cwt. per acre. Yields over a 3-year period indicated that there were only very small differences in the efficiency of the various fertilisers applied. Superphosphate, serpentine superphosphate, reverted superphosphate, basic slag, and North African phosphate are all suitable phosphatic fertilisers on Kaipara clay.

—*E. H. ARNOLD*



[*Sparrow Industrial Pictures Ltd. photos.*

Medium-sized buttons should be used for easy fastening.

Summer Play Clothes for Girls or Boys

By NELL MACPHERSON, Field Officer in Rural Sociology, Department of Agriculture, Auckland

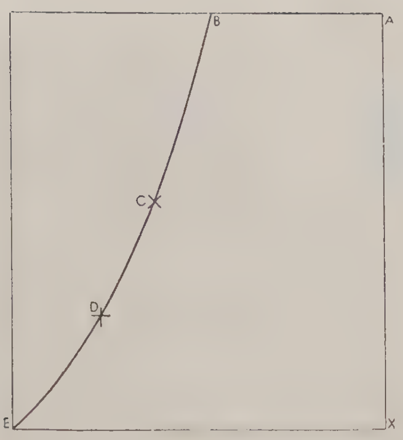
PLAY clothes for small girls and boys should be attractive to look at and wear yet simple in style. For summer sun suits, particularly, the design on the material should be all the decoration needed so that they may be easily washed and ironed. The style should be one which allows for comfort, a certain amount of protection from the sun, and not much alteration as the child grows.

THE sun suits illustrated are suitable for either girls or boys. They are simple to make, nearly all the stitching being done by machine, and open flat for ironing. Though those illustrated are made of cotton print, gingham, seersucker, haircord, or britway may be used, as these fabrics all wear well. In the case of seersucker it has the advantage that it does not need ironing.

The suits illustrated will fit children of 1 to 2 years and 3 to 4 years.

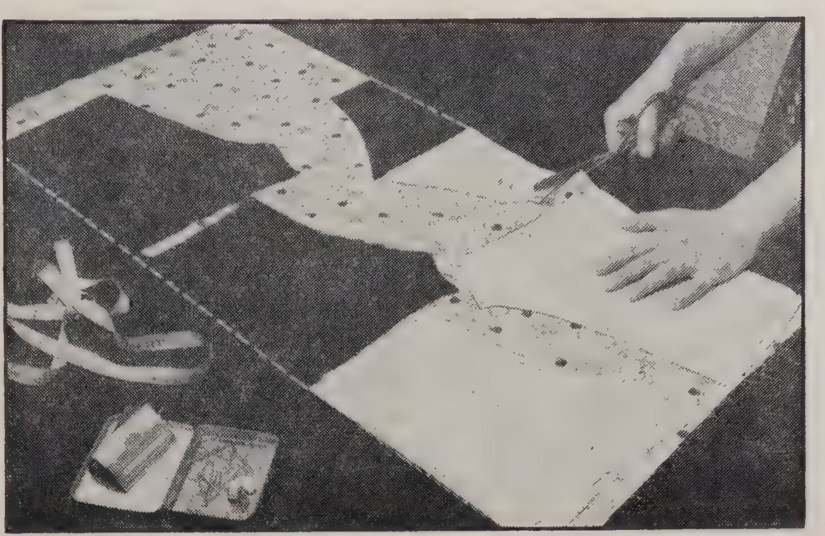
	Child 1 to 2 years	Child 3 to 4 years
Waist	20	23
Outside leg	9	9
Waist to crutch at front ..	9	10
Inside leg seam	1½	1¾
Bib	6	6
Shoulder strap	10	12

Materials required for the two suits illustrated are 1yd. of cotton print, reel of thread, 20 buttons, and 20in. of elastic.



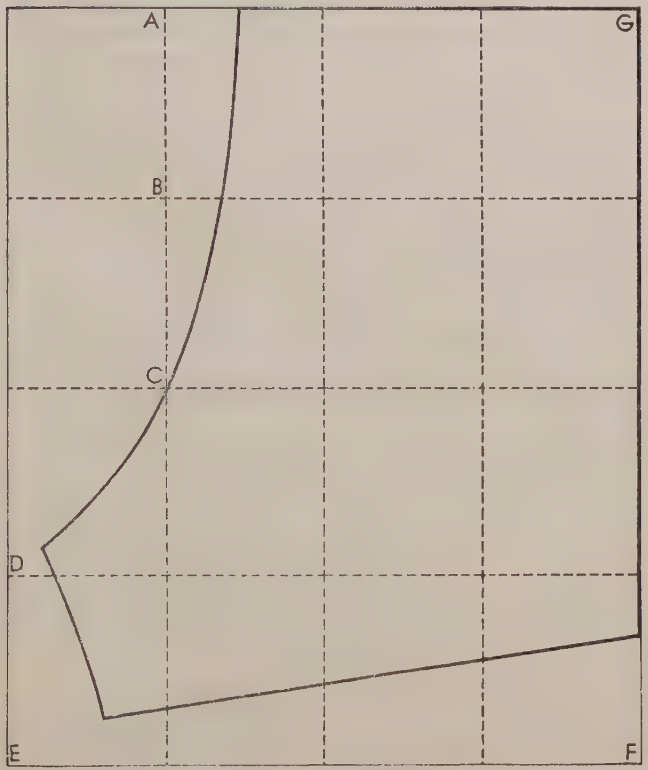
BIB

For the 1- to 2-year-old size take a piece of paper 7¼in. by 6½in. For the 3- to 4-year-old size take a piece of paper 7¼in. by 7⅝in. Now mark both pieces as follows: B, 3in. to the left of A; C, 4in. up from XE and 4in. to the left of XA; D, 5in. to the left of XA and 2in. up from XE. Join B, C, D, and E. Place XA on the fold of the material when cutting out.



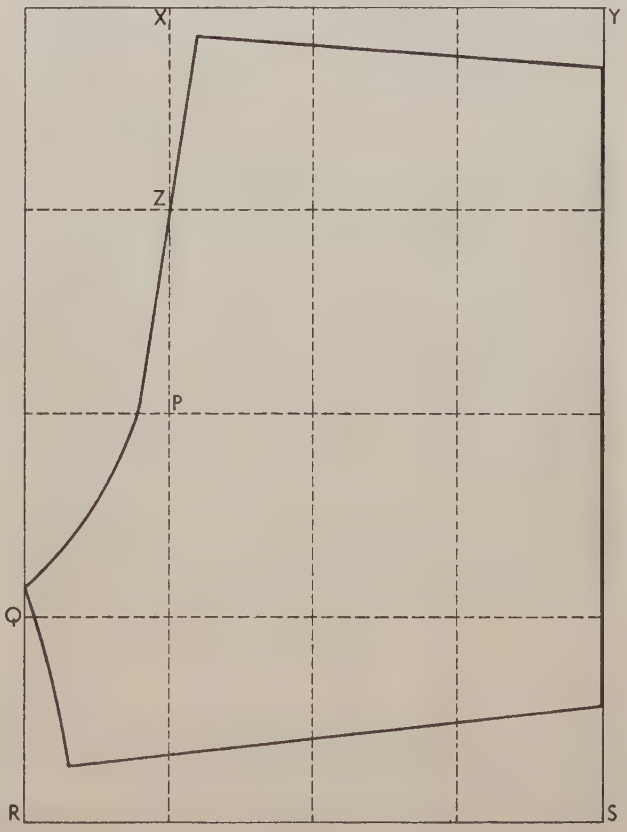
[*Sparrow Industrial Pictures Ltd. photo.*

Layout of the pattern pieces to cut two sun suits from 1yd. of material.



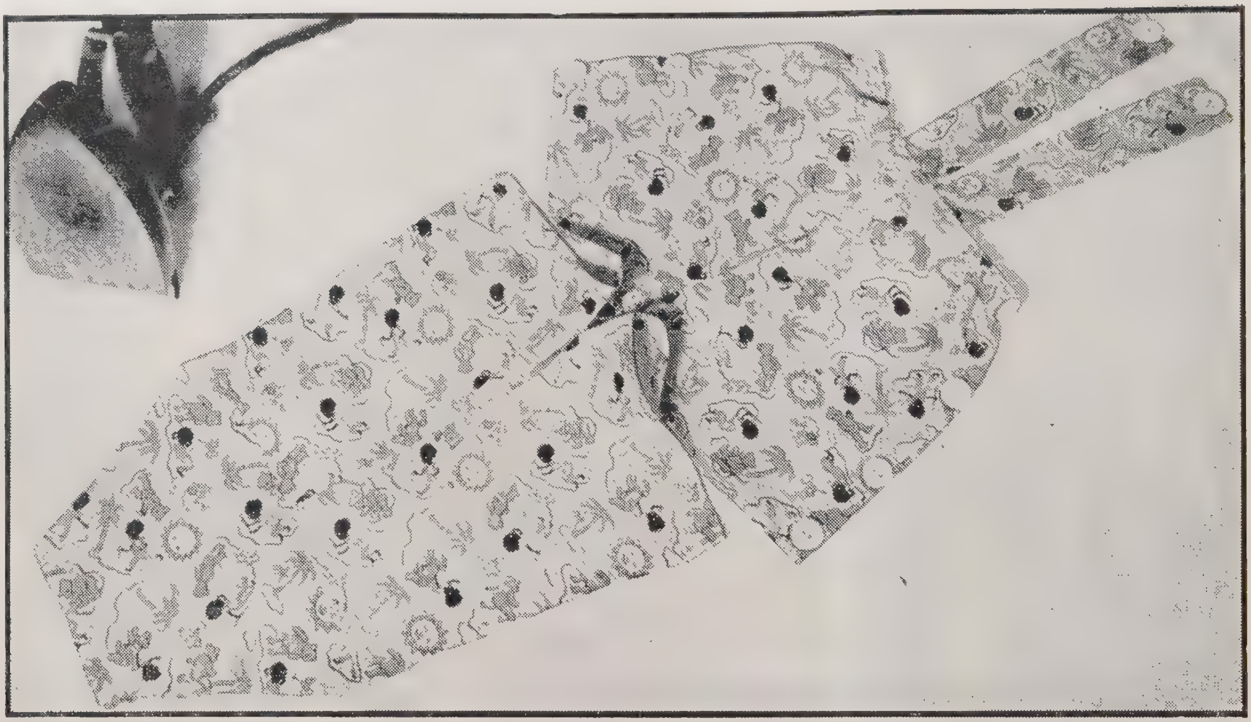
FRONT

For the 1- to 2-year-old size take a piece of paper 12in. by 10in. and fold it in four both lengthwise and crosswise. For the 3- to 4-year-old size take a piece of paper 11½in. by 12in. and fold it in four both lengthwise and crosswise. Now mark both pieces of paper as follows: 1in. to the right of A, ¾in. to the right of B; at C; ½in. to the right of and ½in. up from D; 1½in. to the right of and ¾in. up from E; 2in. up from F. Join the marks as shown in the diagram and place FG on the straight of the material when cutting out. The dotted lines represent the folds in the paper.



BACK

For the 1- to 2-year-old size take a piece of paper 14in. by 10in. Fold it in four both lengthwise and crosswise. For the 3- to 4-year-old size take a piece of paper 14in. by 12in. Fold it in four both lengthwise and crosswise. Now mark both pieces of paper as follows: 1in. down from Y; ½in. down from and ½in. to the right of X; at Z; ½in. to the left of P; ½in. up from Q; ¾in. to the right and 1in. up from R; 2in. up from S. Join the marks as shown in the diagram and place YS on the straight of the material when cutting out. The dotted lines represent the folds in the paper.



The suits opened flat for ironing.

[Sparrow Industrial Pictures Ltd. photo.

Cut the front, back, and bib pattern pieces in paper by following the directions given in the respective diagrams on page 445. There is no pattern for the straps, which are simply straight pieces.

Lay the patterns on the material as shown in the illustration on page 445 and cut the pieces out. From the remainder of the material cut two pairs of straps; one pair 13in. by 3in. wide, and one pair 11in. by 3in.

To Make up

1. Join the centre front and centre back seams.
2. Neaten the seams and press flat.
3. Stitch and neaten the inside leg seams.
4. Join the lower edge of the bib to the front waist.
5. Turn in ¼in. of material right round the garment and stitch it down.
6. Turn down 1in. of material along the back waist and stitch down. Top-stitch along the folded edge for firmness.
7. Thread the elastic through the heading (9in. for the 1- to 2-year-old or 11in. for the 3- to 4-year-old), and stitch it firmly to the material at each end. This will gather the back in to give a snug fit at the waist.
8. Turn in 1in. round the outside of the bib and stitch it down by machine.
9. Turn up ½in. round each leg opening and stitch it by machine.
10. Now turn in 1in. of material down each side edge and stitch by machine.
11. Stitch across the top and bottom of each of the side edges.
12. Make the straps and stitch them to the centre of the back waist.
13. Work 4 buttonholes in each front side edge of the trousers and one at each side of the top of the bib.
14. Sew buttons on at corresponding places on the side edges of the back and at the appropriate places on the straps.

Note: The straps are slightly too long so that they can be lengthened as the child grows.

Colour and Texture in Planning Attractive Meals

WHEN planning a menu for a meal, a day's meals, or a week's meals there are a number of important things to consider apart from the nutritive value of the meals, which should be high. The foods should be attractive in colour and texture and of course need to be served in an inviting manner.

Colour Combinations

All meals need a variety of colour and some useful standard combinations are:—

Roast mutton and green peas (brown and green)

Corned beef and cabbage (deep red and green)

Brown stew and carrots (brown and yellow)

Creamed fish and brussels sprouts (white and green)

Lemon meringue pie (yellow, golden brown, and white)

Prune upside-down cake (black and gold)

Jam flan (dark red and golden brown)

Steamed pudding and custard sauce (brown and yellow)

Texture

There should be different textures present in a meal also, as a meal may be a failure because it is too soft or too crisp.

Combinations of texture are:—

Fruit crisp (crisp top and soft stewed fruit)

Cornish pasty (crisp case and soft filling)

Roast beef (crisp fat outside and soft juicy meat inside)

Fruit salad or jellied fruits (combination of various textures of different fruit)

Liver and onions (firm meat and soft onions)

—*NELL MACPHERSON,*
Field Officer in Rural Sociology,
Department of Agriculture,
Auckland

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All-purpose Jacket in a Simple Pattern

THE snug woollen jacket illustrated will be found useful for a variety of occasions, winter or summer. The simple pattern will appeal particularly to the less-experienced knitter.

MATERIALS required are 19oz. of 3-ply crepe wool, 2 No. 4 knitting needles, and 5 buttons.
Measurements: Length, 22½in.; bust size, 36 to 38in.; sleeve seam, 18in.

Tension: 5 stitches and 7 rows to 1in.
Abbreviations: K., knit; p., purl; st. stitch(es); rep., repeat; tog., together; inc., increase; dec., decrease; cont., continue; patt., pattern; sl., slip. Work the stitches in parentheses to the extent stated after second parenthesis.

Back

Using wool double throughout, cast on 95 st. and work in patt. thus:—

1st row: K. 1 (sl. 1 purlwise, wool to front, p. 1, wool back) to last 2 st., sl. 1, k. 1. 2nd row: P. to end. Rep. these 2 rows until work measures 13½in., ending with a p. row.

Shaping the armholes: Cast off 3 st. at start of next 2 rows. Dec. 1 st. at start of next 14 rows, leaving 75 st Cont. straight until work measures 22½in., ending with a p. row.

Shaping the shoulders: Cast off 9 st. at start of next 2 rows and 8 st. at start of next 4 rows. Cast off remainder for back neck.

Left Front

* Work pocket lining first. Cast on 25 st. and rep. the 2 patt. rows as for back until work measures 5in., ending with a 1st row. Next row: P. to last 2 st., p. 2 tog. Break off wool and leave for the time being.

For main part, cast on 50 st. and continue thus: * 1st row: K. 1, (sl. 1 purlwise, wool to front, p. 1, wool back) 14 times, sl. 1, p. 20. 2nd row: K. 1, (sl. 1 purlwise, wool to front, p. 1, wool back) 9 times, sl. 1, p. 30.

Rep. these 2 rows, noting that the 20 st. of front border are worked in the same patt. as the remainder of the coat, only reversed. Cont. straight until work measures 6in., ending at side edge.

Next row: Rep. patt. 5 times, slip the next 24 st. on to a spare needle for the pocket top and patt. over the 24 st. on the spare needle for the pocket instead; then patt. over the front border st. ** Cont. straight until work measures 13½in., ending at side edge.

Shaping the armhole: Cast off 3 st. at start of next row. Dec. 1 st. at same edge on next 7 alternate rows. Cont. straight until work measures 22½in., ending at armhole edge.

Shaping the shoulder: Cast off 9 st. at start of next row and 8 st. at start of next 2 alternate rows, beg. at armhole edge. Cont. on remaining 15 st. for collar thus:—

Beg. at front edge, patt. to last 5 st., turn. Patt. back. Work 6 rows straight, over all st. Rep. last 8 rows until work is long enough to fit across back neck to centre back. Cast off.

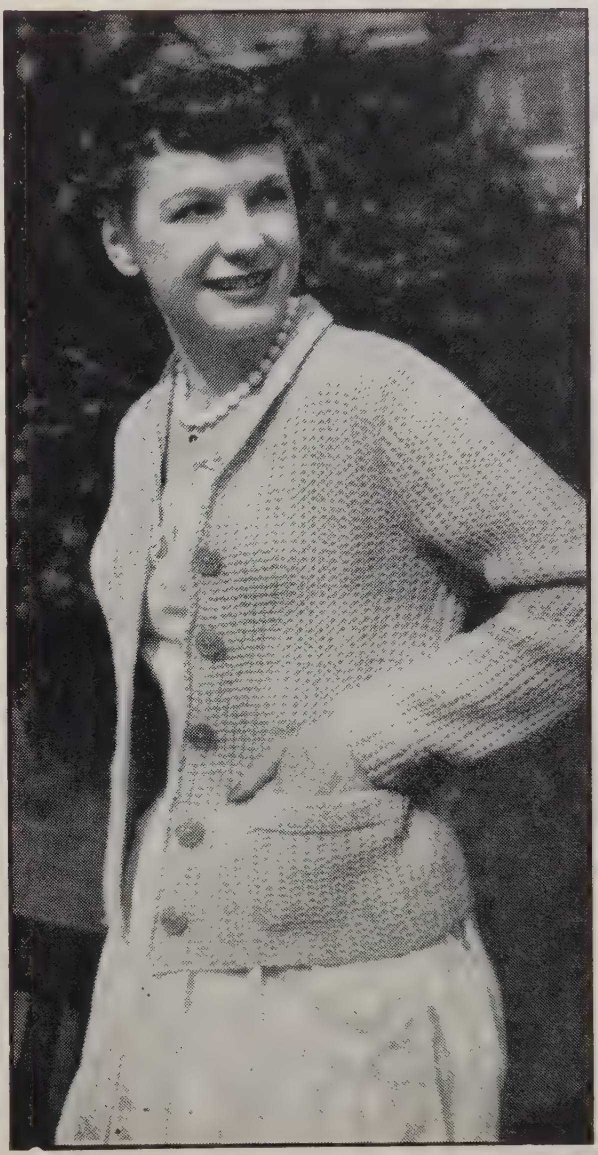
With right side facing, work 1in. in patt. across st. on spare needle for pocket tops. Cast off and fold down, thus showing the reversed side of patt. as front border. Sl. st. pocket lining on wrong side **.

Right Front

Rep. as for left front from * to *, then cont. thus: 1st row: P. 20, (sl. 1 purlwise, wool to front, p. 1, wool back) 14 times, sl. 1, k. 1. 2nd row: P. 30, (sl. 1 purlwise, wool to front, p. 1, wool back) 9 times, sl. 1, k. 1.

Rep. these 2 rows until work measures 2in., ending at front edge. Make a buttonhole in next 2 rows, thus: Next row: Patt. 4, cast off 3 st., patt. to end. Next row: Work to end, but cast on 3 st. to replace the cast-off group in previous row. Make another buttonhole 3in. above the first buttonhole, then cont. straight until work measures 6in., ending at front edge.

Next row: Patt. 20, sl. the next 24 st. on a spare needle for pocket top and patt. over the 24 st. of pocket lining instead, then over remaining 5 st.



Complete as for left front from ** to **, but work 3 more buttonholes as before at intervals of 3in.

Sleeves

Using wool double, cast on 55 st. and rep. the 2 patt. rows as for back until work measures 4in. Cont. in patt., but inc. 1 st. at each end of next row and every following 10th row until there are 71 st., taking extra st. into the patt. as they are made. Work straight until sleeve measures 20in. from cast-on edge, ending with a p. row.

Shaping the top: Dec. 1 st. at start of next 22 rows. Dec. 1 st. at each end of every row until 21 st. remain. Cast off.

Making up

Press all parts lightly on wrong side, using a hot iron and damp cloth. Join collar at centre back and stitch to neck edge. Join side and sleeve seams. Set in sleeves. Turn up cuff for 2in. Add buttons.

GARDEN POOLS

Pools of a suitable size can be a pleasing feature of any garden of reasonable area provided care is taken in the choice of style and siting. Such pools whether used as water gardens or goldfish ponds can be fairly inexpensive and may be the means of changing an unattractive hollow into a pleasing feature of the garden design. Garden pools may be used in flat surroundings such as a lawn or as a foreground to a rock garden with equally good effect.

Garden Pools

THE garden pool, its appearance often enhanced by a small fountain, is one of the most attractive and pleasing of all pieces of landscape architecture. In this article for the flower gardener, C. K. Ellis, formerly Horticulturist, Department of Agriculture, Dunedin, discusses the types of pool which could be built into many New Zealand country and suburban gardens.

WHERE a fountain is included in the pool design great care must be taken that the level of the water is not above the general level of the garden; preferably it should be below it. In all types of pools the water level must be maintained as near to the rim of the pool as possible; if the level falls far below the rim, the pool seems neglected and the water stagnant.

If it is desired to grow water lilies, the pools should not be less than 18in. deep, preferably about 22in. Deeper pools are more difficult to handle and do not warm sufficiently to encourage the best flowering of the water lilies. Where goldfish and other decorative fish are kept the pools again should not be deep; otherwise the fish swim to the lower reaches and often cannot be seen.

Concrete is the best and easiest material with which to construct the walls of the pool. If bricks or stone are to be used, the walls should be up to 6in. thick, and should be coated on the insides with cement mortar, in which some type of water-proofing material has been incorporated. The stones or bricks should also be laid in the same type of mortar. Concrete should be about 5in. thick and if water-proofing material is not incorporated in the mix and in the finishing coat, a water-proofing compound should be applied afterward to the surface. The bottom of the pool should be coated with about 3in. of coke breeze, coarse cinders, or crushed stone on top of which should be laid about 4in. of concrete, which if not water-proof in itself, should have a water-proofing layer placed over the top of it. If steel reinforcing rods are used in the construction of walls and the bottom, they should be turned up at the ends to strengthen the join between the walls and the bottom.

All formal pools need a kerbing round the edge, but informal ones do not. A kerbing should not come more than 3in. above the surrounding garden surface, and can be made of bricks laid sideways, of small pieces of flagstone, or blocks of concrete.

A lawn can be extended right up to the edges of a pool instead of a kerbing being used and gives a very soft, pleasing effect. To be successful, however, the lawn and turf generally must be of excellent quality so that there is no tendency for the turf to break at the edges and fall into the pool. The edges should be sloped back from the pool at an angle of 45 degrees. Large boulders do not make a good edging for a pool unless it is one of reasonably large size or one contained as an integral part of a rock garden.

The pool should always be connected with a constant water supply and a drain should be provided so that it may be readily emptied and refilled. The best method of draining is that using a standpipe with the lower end bevelled to fit into a socket at the lowest point of the pool. The diameter of the pipe will, of course, be dependent upon the amount of water that it is expected to carry; for home gardens usually about a 1½in. pipe is sufficient. When it becomes necessary to drain the pool completely the standpipe is removed. To refill the pool the standpipe is placed back in its socket and the water turned into the pool. The level of the water rises until it reaches the top of the standpipe, when it overflows.

The site for the pool should be chosen with great care. A background of evergreen trees, preferably with fairly dark foliage, is probably the best. Some of the plantings about the pool should include flowers of bright colours which will reflect well on the surface of the water. A few water lilies should be planted in the pool, preferably in some type of wooden tub, to make handling easier. The soil mixture should consist of four parts of good loam and one part of well-decomposed animal manure, preferably bovine. A 2in. layer of sand should be placed over the top of the soil mixture to aid in keeping the water clean and about 6in. of water should be allowed above the top of the sand.

A few goldfish are a great asset in a garden pool for they destroy any larvae, such as those of the mosquito, which may find the pool an attractive habitat. They also add a pleasing touch of movement and colour.

If the water supply is drawn from a stream or from a spring, a silting pool will be necessary at the intake. This allows time for any silt brought in to settle in the silting pool, thus assisting to a marked degree in keeping the bottom of the main pool clean. The intake from the silting pool should be placed below the top level of the water so that leaves cannot be drawn into it and block it and well above the base level so that no silt is carried straight through.

Where the pool is to be informal in design it is best to modify the bottom of it to make provision for marginal plantings. The sectional design may be determined largely by the position the pool is to take in relation to other parts of the garden, especially the immediate surroundings. Where the land is undulating it is often possible to take advantage of the natural depressions which, with a few modifications, may form a very satisfactory bottom for the pool. In cases such as this the higher parts of the depressions may be developed as rock garden. Where pools of this type are to be built their borders in plan should be as irregular as possible and the depth regulated so that the whole marginal area is shallower than the central area. There are many plants which grow well in the marginal areas of such pools. Where the site is flat it is possible to obtain some relief by excavating the soil for the pool and using it to build a mound immediately behind or alongside it.

If the idea of a rock garden background for the pool does not appeal, a well-maintained grass bank can be developed which will give almost as pleasing an effect. It should slope gently to the water's edge and can easily be graded into the right shape with surplus soil from the pool excavation.

A pleasing effect can be obtained where the land is mainly flat by sinking the whole of the pool and its surround a few inches below the normal level of the surrounding garden. Thus a shallow step down to the water is formed and additional drainage of the surrounding land achieved.

A modification of the normal garden pool is the small swimming pool. It will be difficult, however, to site a small swimming pool in an established garden. Therefore it is advisable for the gardener who intends to have such a pool ultimately to make provision for it in the original landscaping of his grounds. In the construction of a swimming pool a great amount of soil must be removed, which, of course, cannot be considered a disadvantage where the garden site is flat, as it can be used in building relief for the landscape at other points. It is particularly useful for building mounds immediately surrounding the pool on which shrubs or small trees can be grown as windbreaks to prevailing winds.

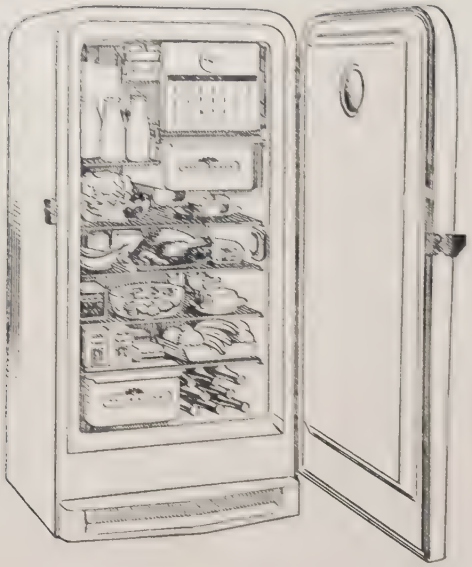
The surrounds of the pool can be made attractive by paving the areas with flagstones or by placing flagstones irregularly around the edge in lawn. A few perennials, such as agapanthus or an occasional specimen hydrangea, look well alongside water. A small rustic shelter built near the pool with beds of irises planted on either side of it looks particularly effective. This shelter, of course, should always be placed on the sunniest side of the pool.

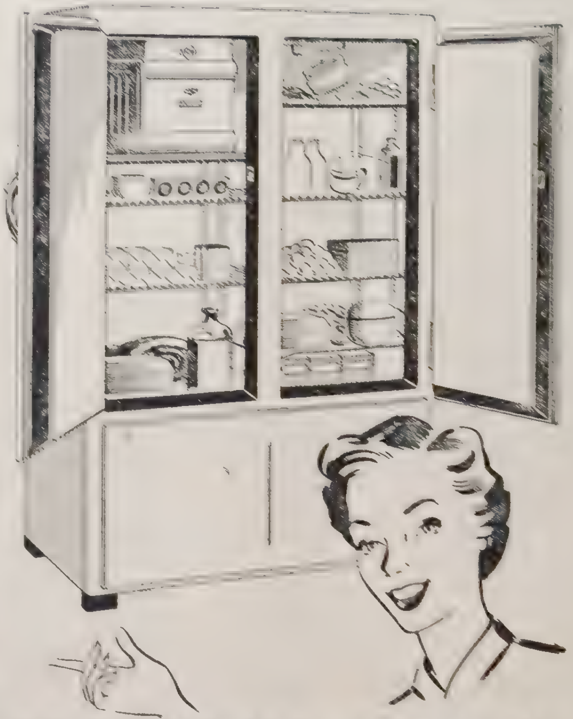
Illustrations on opposite page: Top right—A water garden and fishpond in the front lawn. Top left—A paving path edges this pond in the rock garden. Douglas Elliott photo. Middle—The raised kerb enhances this design for the smaller back lawn. Bottom right—An informal effect with garden surrounding the pond. Photo News Ltd. photo. Bottom left—A formal design of paved edges with a background of rock garden. Douglas Elliott photo.

Flower Garden Work for December

Annuals from late sowings should now be thinned finally. The hoe cannot be used much in the flower borders, so most of the weeding will have to be done by hand. It should not be necessary to stake any but the tallest and most vigorous types of annuals. Only by continuing to remove all dead flowers and developing seed pods can a continuous display of flowers be ensured.

Begonias of the tuberous-rooted type growing in pots should be coming into flower now, and, if necessary, they should be fed with weak liquid manure. After the main flowering period has been reached they should not be fed, as this is inclined to induce weak, useless growth. "Laterals", unwanted side shoots, can still be removed to





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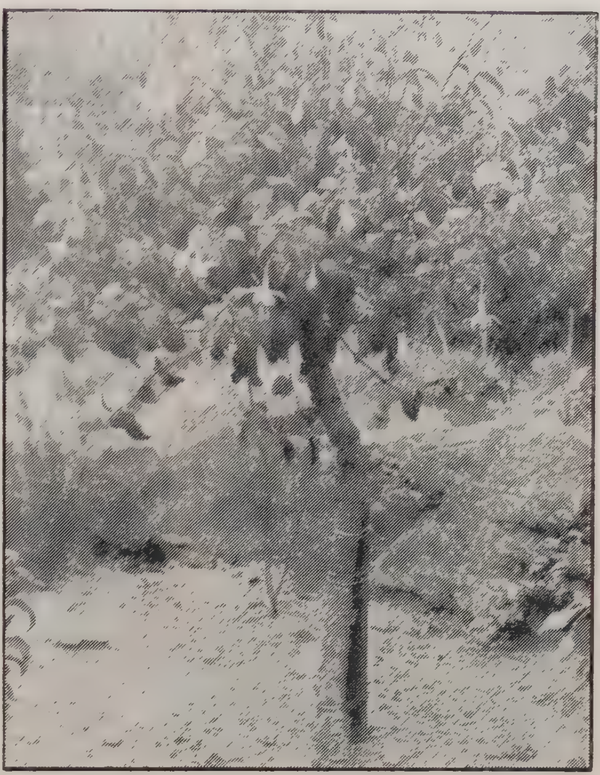
be used as cuttings. The small side flowers (female flowers) should be removed, as they are of little value and simply detract from the beauty of the main or terminal flower.

Borders should be given an overhaul during December, marguerites, wallflowers, and other spring flowering plants which have passed their best being either cut back severely or pulled out. The gaps left can be planted up with late-raised bedding plants such as marigolds.

Bulbs which flower in spring, such as daffodils, hyacinths, and tulips, may be lifted as soon as the leaves have turned brown and withered. They should never be lifted before this because the bulbs are dependent on the food withdrawn from the leaves for their well-being next season. When the bulbs are lifted the soil should be shaken from them and the foliage left on if it does not fall off readily. They should be placed in a single layer in wooden trays and be put in an airy shed to dry off. If they are stored in heaps, they sweat and suffer damage, and if left outside where they are exposed to the sun, they are also damaged. This applies particularly to tulips, whose development is greatly hampered by exposure of the bulbs to bright sunlight. The dead foliage and loose scales should be removed as soon as the bulbs are quite dry, but twin or triple bulbs should not be pulled apart at this stage because injury to the basal plate and the entry of fungus might easily result. Rotten bulbs or those soft at the neck should be taken out and burnt immediately, for it is likely that they are infected with the pest known as bulb mite. Bulbous irises will start to die down in December, and these too may be lifted and stored as soon as the time comes. These bulbs will be replanted again in early autumn, but any bulblets may be removed and sown in drills almost immediately. In two to three seasons they will produce flowers.

Bearded irises have horizontal fleshy stems or rhizomes, which develop along the surface of the soil and soon overcrowd each other. For good displays with healthy plants these irises should be lifted and divided every 2 or 3 years. It is possible to lift and divide them immediately after they have ceased flowering; in fact, under New Zealand conditions, this appears to be the best time for the operation. Bearded irises thrive in a rich, well-drained soil and appreciate an annual dressing of 2oz. of superphosphate and 2oz. of carbonate of lime to each square yard of bed.

Carnations should be layered as soon as the growths are large enough to be handled easily. About 5in. back from the tips the stems should be split up the centre with a sharp knife and pegged down into the soil with a fairly shallow covering over them. In frost-free districts the perpetual flowering types are infinitely preferable to the border varieties, since they flower over a longer period.



Fuchsias make attractive standard plants which should be firmly staked.

Pinks should be replanted every 2 or 3 years, because old plants produce few flowers and look untidy. Pinks can be propagated from December to February by "pipings", which are pieces 2in. to 3in. long pulled from the centres of the new shoots. These should be inserted in sand in a cold frame, or in boxes with a sheet of glass to cover them. A sheet of newspaper should be placed over the frame or box to exclude intense sunlight. In 3 to 4 weeks the pipings will have rooted and they may be planted out soon afterward to their flowering positions.

Chrysanthemums should be staked as soon as they have grown tall enough. This job should not be delayed, because winds will take heavy toll of the best stems. The stake should be driven in a little behind the stool and the main stem tied to it. A loose loop of raffia right round the plant and stake will be found of assistance in very windy localities. When driven into the ground the stake should reach to about the same height as that to which the flower stems are likely to grow.

Dahlias require a lot of water during their growing season, so a careful watch should be kept to see that they get it. If the soil becomes dry, it should be given a thorough soaking, and a few hours later should be gone over with the hoe to prevent it from caking. Staking should be continued, and further ties will be necessary on stakes put in during November.

Fuchsias will be growing strongly during December and should be watered thoroughly when necessary. They appreciate a light dressing of equal parts of superphosphate and sulphate of ammonia watered in at the rate of ½oz. per gallon of water per square yard.

Herbaceous plants such as lupins, delphiniums, and doronicums should now be gone over in the earlier districts. Faded flowers and flower spikes should be cut off and the plants generally tidied up. When all flowering has finished the stems should be cut back to the ground and a generous mulch of good compost given around

[*Photo News Ltd. photo.*

Well-tended sweet peas produce long-stalked flowers which make a good show in decorative vases.

[Photo News Ltd. photo.

Advanced stage of defoliation of chrysanthemum plant caused by eelworm attack.

the plants. This often produces a further batch of shoots which will flower during late autumn. The second shoots, however, should be thinned out to two or three per plant.

Pruning of ornamental brooms should be done as soon as they have finished flowering. Old wood should not be cut into, as the results will probably be fatal to the plant. The best plan is to shorten back each shoot that has flowered to within an inch or two of its base. New shoots will grow from the stub that is left. Early flowering heaths and deutzias should also be pruned hard back immediately after flowering.

Roses of the climbing and rambling types should have their new growths tied in before they are long enough to sway about and get damaged. Roses of all types can be budded as soon as the bark lifts readily on the stocks.

Seed may be sown during December of a number of herbaceous perennials which are cheaply and easily raised in the home garden. Among these are Russell lupins, aubretias, anchusas, thalictrums, heucheras, and *Alyssum saxatile*. The seeds should be sown in boxes, or in small open beds, and the resultant plants set out in the borders in autumn.

Sweet peas will now be in full bloom, and every few days all spent flowers and developing seed pods should be removed in order to keep the plants blooming well. It is wise to remove a few of the side shoots during the plants' growing period to keep them open and give adequate room for the development of long flower stalks.

Seasonal Troubles

Aphides (or greenfly) will again be troublesome during December on a very wide range of host plants. Nicotine sulphate sprays should be used at regular intervals to control them.

Chrysanthemum eelworm attack will now be showing its effect on the lower leaves of the plants. These leaves will be parti-coloured, shrivelled, or dead and should be removed and burnt.

Narcissus flies of the large type are common in many flowering bulbs. They are stout, hairy insects, usually marked with red or orange bands. They lay their eggs near the bases of the leaves of bulbous plants toward the end of the bulbs' growing season. When bulbs are near the surface the flies may crawl down and lay their eggs directly on the bulbs. After the eggs have hatched the larvae eat their way into the bulbs, which, even if not killed, may be prevented from flowering next season. Affected bulbs are shrunken and soft and usually have a corky basal plate. The larvae, which are maggots, may be seen if the bulb is broken open or cut through the middle with a knife.

The larvae remain inside the bulb right through the dormant season, and this fact has a great bearing on the distribution of the pest. Since the larvae are completely enclosed within the bulb, heat treatment is the only control measure which is completely effective against them. The bulbs should be immersed for 2 hours in water which is maintained continually at 110 degrees F. Care should be taken not to exceed 110 degrees F. or results may prove fatal. The treatment should be given all new stocks of bulbs as a precaution against introducing the pest to a clean garden.

Thorough cultivation of the soil between the bulbs as soon as the foliage begins to die down, and after it has been removed if the bulbs are not lifted, fills all holes left by dying down of leaves and makes it much more difficult for the flies and larvae to reach the bulbs.

Pointers for Salad Preparation

Don't soak the salad greens, even if they are not crisp.	. . . wash the greens quickly and hang them in a cloth in a draught if it is necessary to make them crisp.
Don't serve the greens dripping wet.	. . . swing the greens dry in a cloth or shake the water off in a sieve.
Don't always shred the lettuce.	. . . serve whole lettuce leaves sometimes or tear the leaves into attractive pieces.
Don't use only lettuce as the green part of a salad.	. . . use shredded cabbage heart, silver beet leaves, endive, watercress, or nasturtium leaves.
Don't make up a salad only with colourless ingredients such as celery and apple or potato and celery.	. . . add a brightly coloured garnish to a white salad: sieved hard-boiled egg yolk, beetroot (raw and grated or cooked and chopped), or grated carrot.
Don't use two hard ingredients such as nuts and raw vegetables together.	. . . sprinkle chopped nuts over salads with fruit as soft ingredients.
Don't use up in a salad left-overs that have gone mushy or stale vegetables that are limp.	. . . use left-overs if they have a good flavour and can be made to look attractive.
Don't serve meat or fish salads that lack flavour and colour.	. . . season well and add highly flavoured foods like fried onion, curry, and piquant sauces to cold meat or fish when using them in a salad, and use a coloured garnish.
Don't use too many strongly flavoured foods together in one salad, if they do not "go", for example, cheese or tomato and sweet fruits.	. . . use some imagination, and experiment with numerous ingredients in salads, taking care that they blend well in flavour, colour, and texture.
Don't serve large pieces of meat or raw vegetable that are difficult to deal with on the plate.	. . . cut meat, fish, and raw vegetable or apple into mouthful-sized pieces or mince or grate them.

—*EIRENE E. UNWIN, Field Officer in Rural Sociology,*
Department of Agriculture, Christchurch

Attractive Meals Can be Made from Left-overs

"What shall we have for tea tonight? Let's see, what is there left over—anything that will do? Yes, cold meat and some potatoes I can fry up. That will do, with some tomato sauce."

How often is something like that murmured by the housewife as, afternoon tea over, she turns her thoughts to the next meal? And how often is it something more like this she says?—

"What would be nice for tea tonight? I wonder whether I can make up something interesting from what I have left? Let's see; yes, cold meat, some vegetables, gravy, and the vegetable water. Good, I think I'll make a good thick soup with those."

This?
or
This?

Cold mutton and fried potatoes served as left-overs and the same foods served as an attractive meal (mutton miriton).

IN this article by Eirene E. Unwin, Field Officer in Rural Sociology, Department of Agriculture, Christchurch, more ideas which the housewife intent on making something nice for tea might have had are discussed. Numerous suggestions are given for creating appetising dishes from uninteresting-looking left-overs, frequently with the addition of one or two fresh ingredients to improve the flavour; but the chief new ingredient is usually just ingenuity!

IT is often thought at the end of a meal that the amounts left over are too small to be of use, and so they are discarded, but most of the left-overs from a meat and vegetable course can be combined to form a sizable dish, though singly they might be insufficient even for one person. The same applies to puddings. Part of today's pudding can well be used as the basis of tomorrow's. Ingredients may need to be added to make the dish big enough, to give flavour, and to vary it from the original, but the basis is something that might otherwise be wasted; and today, with a world shortage of food, no one should be content with even small amounts of waste.

The art of serving up left-overs is to disguise them so that they are not immediately recognised as the remains of yesterday's meal. The family can get much fun from guessing (after they have eaten and enjoyed it) "what went into that dish", and an appreciation of mother's ingenuity as well as the family's enjoyment of the meal are ample rewards for the extra trouble that has gone into making it.

Frequently the new dish may be prepared immediately after the meal, any fresh ingredients needed being cooked while the range is still hot. The utensils used in preparing it may then be washed up with the remainder of the meal things. The housewife is then in the happy position of not having to think again of at least one future meal until it is time "just to pop it in the oven" to heat it up.

There are a few rules which must be observed in using up left-overs. Protein foods must not be recooked; they should not be more than heated through, or they will go tough. This means that when fresh ingredients are added to left-over meat, fish, cheese, or egg dishes these new ingredients should be cooked first and then added to the left-overs. The same rule applies to using up cooked vegetables, as much extra cooking would destroy most of their remaining food value. Finally, it should be remembered that fried foods are less easily digested than those not coated in fat, because the fatty layer is not itself digested off until after the food has passed through the stomach; therefore only after that can digestive juices get at those parts of the food which were inside the layer. This applies less when large pieces of food are fried as rissoles or patties, because by the time the food reaches the stomach it has been cut and chewed into small pieces, most of which, coming from the inside of the original piece, are not coated with fat.

Savoury Left-overs

It is important that made-up dishes should be well flavoured, and the housewife can make good use of a stock of sauces and flavourings to give variety, such as Worcester, tomato, and plum sauces; vegetable, meat, or

Sausages and mashed potatoes, with a difference.

yeast extracts; curry powder; herbs; onion and celery essences or salts, as well as, of course, salt, pepper, and mustard. Left-over gravy is a great asset both for meat and vegetable dishes, and if there is none available, the following is a tasty substitute.

Onion Gravy

Slice onions finely and cook them in a small amount of hot fat in a saucepan. Keep the lid on, but lift it to stir fairly frequently and do not let the onions burn. When they begin to brown a small quantity of water may be added. Continue cooking till the onions have begun to mush, and a rich brown sauce has been obtained. Season and add more water and thicken with flour if a greater quantity or different consistency is required.

Other ingredients frequently added to improve flavour are bacon, minced and fried and mixed in or served as a garnish, cheese, tomatoes, and onions, usually sliced finely and browned in a little fat which brings up the flavour. The ingenious housewife will also experiment with rice, oatmeal, macaroni, breadcrumbs, and pastry, which increase bulk, and add interest, but which supply little extra flavour. A less usual ingredient, but one that can be used very successfully in savoury dishes, is apple. Several suggestions are made later for its use.

Left-over Meats

To use up left-over meats the following suggestions are given:—

1. Slice and heat up in gravy or in stewed or pureed tomatoes.

2. Chop small or mince, and add to a soup (especially meat left over from a stew, when the stew gravy can be added to vegetable stock or milk to make the soup).

3. Make a savoury mixture from minced meat, moistened with stock or gravy, and with ample flavouring ingredients added. Serve on toast or with water biscuits, or use it to stuff baked potatoes or large tomatoes. After stuffing these should be just heated through and served hot.

4. Slice, season well, dip in batter, and fry, or small seasoned pieces may be mixed with batter, and spoonfuls of the mixture fried as fritters. Serve with gravy or tomato sauce.

Fish

Fish may be treated as follows:—

1. Flake, heat up in anchovy, parsley, or curry sauce, and serve with a green vegetable or tomato.

2. Mash or flake small and add to a milk soup.

3. Flake, season, and heat up in stewed or pureed tomatoes.

4. Flake, mix with salad dressing, season, and serve in lettuce-leaf cups. Other salad ingredients may be added.

5. Mince or mash with left-over potato and add milk, butter, and seasoning. (Be sure to have adequate flavour.) Fill a greased casserole with the mixture and brown it in the oven. Serve it with a sauce unless it has been made moist enough.

6. Flake, add some other flavoured food such as onions or curry powder, mix with batter, and fry as fritters.

Vegetables

Onion and celery essences or salts are particularly useful for vegetable dishes.

1. Almost any varieties of left-over vegetables may be mixed together, chopped, seasoned, and heated up in a greased casserole or pie-dish. This "vegetable pie" can be served with cold or hot meat, or with tomato sauce or gravy as a tea dish. The mixture should be well seasoned, and some freshly prepared flavour foods added if necessary.

2. Mash several vegetables together, season and flavour, and make the mixture into patties alone or with batter.

3. Rub the left-over vegetables through a strainer, with a wooden spoon, and make them into a soup with milk or stock. Gravy or tomato—cooked and pureed with the vegetables—is an improvement. Season well.

4. Add the chopped vegetables to a white sauce, season, and heat through. Just before serving stir in some grated cheese. Serve on toast, or pour into a casserole, sprinkle with more grated cheese, and brown in the oven.

Meat and Vegetables, Potato, Gravy, and Other Oddments

Meat and vegetables, potato, gravy, and other oddments may be treated as follows:—

1. Mix minced meat and chopped vegetables together, and season and moisten them. Half-fill individual oven-proof dishes with the mixture and break an egg on top of each. Place near the bottom of the oven to heat through, so that the egg will cook but not get hard on top. Alternatively the dishes could have lids on.

2. Chop meat and vegetables small and season and stir them into batter. Fry the mixture in spoonful lots as fritters.

3. Mince, season, and moisten the meat. Flavour it well. Mash all vegetables and spread over the top of the meat in a greased casserole. This is a pleasant variation of shepherd's pie.

4. Cut meat and root vegetables into dice, add peas, and diced beans or celery if available. Season well. Stir all into a white sauce, heat through, and serve on toast. Grated cheese may be stirred in at the last minute if flavour is inadequate, or each plate may be garnished with curls of bacon.

5. Make a ring of mashed potato or cooked rice in individual dishes or in one large oven plate. Fill the centre with a savoury meat and vegetable mixture, well seasoned and flavoured, and mixed with plenty of gravy. Heat this through and just before serving put it under the grill or at the top of the oven to brown the top of the potato.

6. Cut or mince meat, chop vegetables, and stir them into a curry sauce in which a sliced apple or two have been stewed. Left-over stewed apple can be added instead. Other fruit, especially raisins and sultanas, may be added, or apricot jam.

Sausages

It is with sausages especially that apple may be served.

1. Peel and slice the cold, cooked sausages, or cut them into fingers. Arrange them in layers in a casserole with slices of raw apple and cooked or finely chopped raw onion. Add water or stock and cook till apples are tender. If already-cooked apples are used, just heat the mixture through.

2. Cut peeled sausages into rings and heat them up in some left-over stewed apple or apple sauce. Season and serve for breakfast or tea.

3. Slice peeled sausages lengthwise into halves. Spread each piece with chutney or sauce and heat through in the oven. Serve with toast or hot mashed potato or other vegetables.

4. Chop peeled sausages into small cubes and mix with stewed tomatoes or tomato puree and season. Thicken the mixture with flour and serve hot on toast, or heat through in a casserole with buttered crumbs on top.

5. Cut peeled sausages into rings and add to left-over boiled rice. Brown thinly sliced onions in a little fat in a saucepan. Add rice and sausage and heat through. Stir all together and season. Serve with tomato sauce.

Casual casserole, made of left-over vegetables and cheese sauce and with a crispy topping.

RECIPES FOR LEFT-OVER INGREDIENTS

Potato

Cheese Crumpets

Cheese, grated, and breadcrumbs in equal parts
Mashed potato
Egg
Salt and pepper

Mix crumbs and cheese with mashed potato, pepper and salt, and a well-beaten egg to a stiff paste. Reserve a little of the egg for coating. Roll a piece of the mixture in egg or egg and milk, and crumbs, and fry in a little fat, or cook in a baking dish in the oven.

Ham and Potato Rolls

2oz. of minced ham or minced cooked bacon
½lb. of cooked mashed potatoes
Salt and pepper
3 drops of onion flavouring or some finely sliced fried onion
1 egg
Breadcrumbs

Add seasoning and ham to the potato with about a dessertspoon of beaten egg. Make six sausage-shaped patties from the mixture, brush with beaten egg, and roll in crumbs. Fry or bake.

Bacon and Potatoes

Cold, cooked potatoes
Bacon rashers
Onion flavouring or fried sliced onion

Slice the potatoes and spread them over the bottom of a baking tin or casserole. Cover them with rashers of bacon. Sprinkle onion essence or fried onion over, and cook in a moderate oven for 15 minutes.

Cheese and Potato Pudding (from India)

Cold, cooked potato
Grated cheese
Breadcrumbs
Salt and pepper
Butter or good dripping
A cut onion

Rub a fireproof dish with onion, butter it, and sift breadcrumbs lightly over. Slice some cold, boiled potatoes into this, dab with butter, sprinkle on seasoning, and some crumbs and cheese. Repeat these layers till the dish is full, finishing with a thick layer of crumbs and cheese. Bake for 20 minutes in a quick oven. Serve with a sauce. Alternatively nearly cover the mixture with milk before putting on the last layer of crumbs.

Other Vegetables

Runner-bean Salad

2lb. of cooked runner beans
1 finely chopped onion (cooked, if preferred)
¼lb. of raw cabbage
1 medium-sized cooked beetroot
Salad dressing
2oz. of grated cheese
1 tomato

Shred the cabbage finely, cube the beetroot, and mix these with the beans, onion, and enough dressing to moisten. Pile on a dish and garnish with grated cheese and slices of tomato. (Suitable for individual or salad-bowl salads.)

Scotch Carrots

Cooked carrots cut into long pieces (not rounds). Small, whole ones are most suitable
Mashed potatoes
Sausage meat
Beaten egg
Crumbs

Wrap the carrots with mashed potato, keeping the carrot shape. Then wrap them with sausage meat, and egg and breadcrumb them. Fry them in deep fat. Cut the "carrots" lengthwise and serve very hot.

Carrot Souffle

2 cups of cooked mashed carrots
1 cup of milk or cream
3 eggs, separated
Breadcrumbs
2 tablespoons of chopped onion fried in 1 tablespoon of fat
Salt and pepper

Add onion to mashed carrots, and then beaten egg yolks and seasonings. Beat egg white till stiff, and blend above mixture into egg whites. Mix all lightly and pile it into a greased baking dish. Set the dish in a pan of hot water and bake the souffle 15 to 20 minutes in a hot oven (375 degrees F.).

Casual Casserole

3 tablespoons of butter or good dripping
3 tablespoons of flour
2 cups of milk
1 teaspoon of salt
⅛ teaspoon of pepper
⅓ cup of grated cheese
½ teaspoon of dry mustard

Make a sauce of the ingredients by the following time-saving method: Cream fat and flour, and heat them with the milk and cheese in the top of a double boiler for 15 minutes. Add seasonings and whip the sauce with a beater. To this add:—

1½ cups of cooked green beans
1½ cups of cooked diced carrots

Heat these through, place the sauce and vegetables in a casserole, and cover them with the following crispy topping:—

1 cup of cereal flakes
1 teaspoon of melted butter or dripping
¼ cup of grated cheese
Minced onion
Bits of left-over cooked ham or bacon

Heat the flakes and melted butter, add the other ingredients, and sprinkle this over the casserole and serve hot.

Cabbage with Bacon

Cooked cabbage
2 tablespoons of bacon fat
2 tablespoons of flour
1 cup of milk
1 tablespoon of finely chopped onion
Salt and pepper
Bacon

Cut the bacon into pieces about 2in. long and fry them in curls in a saucepan. Put them aside to keep warm. Reserve the fat and fry the onion in it, and then stir in the flour and cook till smooth. Add the milk a little at a time, stirring the mixture till smooth, and letting it boil after each addition.

Add the cabbage chopped small, season, and reheat. Serve the mixture in a hot serving dish garnished with the curls of bacon.

Miscellaneous Left-overs

Savoury Rice with Chicken

2 cups of cooked rice
1 large onion, sliced finely
½ cup of sultanas
½ cup of peanuts
1 large carrot
2 rashers of cooked ham or bacon
1lb. (about) of chopped cooked chicken
Salt and pepper

Lightly fry the cooked rice in about 1 tablespoon of fat. Use a large pan and stir all the time. Place it on a hot dish and keep it warm in a moderate oven. Fry the onion and drain it

Apple cake, served cold, a new version of apple charlotte.

on paper. Meanwhile fry the sultanas and peanuts together, salt them, and mix them with the onions and rice. Keep all these warm. Heat up the ham or bacon (chopped small) and the chicken, sprinkle them on top of the rice mixture, and garnish with grated raw carrot and chopped parsley.

Mutton Miriton (from Ceylon)

Cold roast mutton or lamb
Salt and pepper
Chopped parsley
Finely chopped mint
Thick, well-seasoned brown sauce (gravy or onion gravy)
Tomato sauce
Mashed potato

Cut the meat into rather thick slices, trimming off skin and fat. Dredge the slices lightly with pepper and salt, sprinkle them with parsley, and arrange them overlapping on a greased fireproof dish. Arrange a border (piped if possible) of mashed potato all round. Mix equal quantities of the brown sauce and tomato sauce together, and pour enough of this over the meat to cover it. Bake in a fairly quick oven and dust the top of the sauce with the freshly chopped mint just before serving.

Fish Shortcakes

2 to 3 tablespoons of chopped onion
4 tablespoons (2oz.) of fat
4 tablespoons (a little over 1oz.) of flour
2 cups of milk
⅓ cup of grated cheese
Hot plain scones or toast
1½ cups of flaked cooked fish
Salt and pepper

Cook the onion slowly in the fat till tender. Blend in the flour. Add the milk slowly, stirring constantly, and cook until the sauce is thickened. Add the cheese and fish, season, and heat the mixture through, stirring occasionally. Serve it with hot plain scones or on toast. (The scones could be split and toasted or baked.)

Suggestions for Sweet Left-overs

Sweet left-overs are not as easy as savoury left-overs to turn into "something else". But frequently a pudding eaten hot is not unappetising cold, or if it needs to be hot it can be warmed through as it is and loses little of its attractiveness. It should usually be transferred from the dish it was originally served in to a smaller dish. This is especially important for all baked puddings, as the scraps round the sides of a pie-dish or casserole half the contents of which have been eaten should not be allowed to burn on, as would occur if the pudding were reheated in the original dish.

Cold desserts, of course, can be served again cold another day, but they too should be served on a clean dish.

Baked and Steamed Puddings

1. To warm baked and steamed puddings and prevent their becoming dry it is a good idea to stand the remaining piece on a plate or sponge tin, over a saucepan of hot water, with a pudding basin inverted over it, or to put it in the basin, cover it, and heat this over hot water. It can be heated up, covered, in the oven, but the greater heat tends to dry it out.

2. Slices of plain suet pudding or baked caky pudding may be dipped in egg and milk, fried a golden brown, and served with hot jam or golden syrup.

3. Any pudding which at all resembles cake, with or without fruit in it, may be crumbled when stale and used instead of sponge cake as the basis of a trifle, or it may be set in a jelly, which should be made with fruit juice instead of water, unless it is one of those with plenty of flavour. The cake makes the jelly a more satisfying pudding and it goes considerably further.

4. Stale cake or caky pudding, the fruitier the better, may be crumbled, soaked in milk (and beaten egg, unless it were rich originally), and rebaked. A little spice or jam stirred in is an improvement, and some baking powder may be necessary. If insufficient crumbs are available, add flour, baking powder, fat, and egg in the usual proportions for a baked cake pudding.

Stale Cake Flan

Pastry to line a deep plate (not cooked)
Jam
Cake crumbs
Sugar
Milk
Essence

Spread jam thinly over the pastry. Mix the remaining ingredients to a moist consistency and pour them into the pie. Bake in a quick oven, lowering the temperature when the pie is nearly cooked to allow it to dry out. If using crumbs from a plain baked pudding or suet pudding, add butter and a beaten egg to the mixture.

Cake-crumb Steamed Pudding

1 cup of cake crumbs
¼ cup of milk
1 teaspoon of baking soda
1 egg, beaten
½ cup of flour
1 tablespoon of butter
1 tablespoon of golden syrup
2 tablespoons of sugar
Fruit and/or nuts, as liked
Essences, as liked

Dissolve the soda in the milk and moisten the crumbs with it. Stir in all the other ingredients after melting the syrup and butter together. Steam the mixture in a greased bowl for 1½ to 2 hours.

Fruit and Fruit Puddings

Small quantities of fruit may, of course, be converted into numerous attractive sweets. They may be set in a jelly, or pulped and made into a fruit whip with eggs and gelatine. A charlotte may be made with any fruit, but the tart varieties are better. Cake or caky pudding crumbs may be used instead of part or all of the breadcrumbs.

The recipes for two variations from apple charlotte are given below. The first comes from Denmark and the second from Southern Rhodesia.

Apple Cake

A bowl of stewed pulped apple, slightly sweetened
3 tablespoons of sugar
About 2oz. of dried breadcrumbs
About 2oz. of butter
Whipped cream
Jam

Mix the breadcrumbs and sugar and fry them in the butter, stirring meanwhile. Butter a charlotte mould, put a layer of the fried crumbs at the bottom, then a layer of apple pulp, and last a thin layer of jam. (Heat the jam to make it spread easily, if it is at all stiff.) Continue these layers till the mould is full, finishing with a layer of crumbs. Turn the apple cake out of the mould and decorate with the whipped cream. Alternatively it may be made and served in a glass dish, and garnished with the cream.

Crisp Apple Scallop Pudding

1 quart of stewed apples
¾ cup of cornflakes
⅓ cup of light brown sugar
4oz. of butter
⅛ teaspoon of cinnamon (omit if preferred)

Place apples in a shallow baking dish. Blend cornflakes with butter, using two knives. Add remaining ingredients, and sprinkle the crumbs over the apples. Bake the dish in a moderate oven till slightly brown.

Photographs by Green and Hahn Photography Ltd.

Play Balls are Fun for Toddlers

CHRISTMAS gifts for toddlers are often a problem, as clothes for them are more a present for the mothers than the children, and toys strong enough to stand up to their handling are often expensive. In this article Eirene E. Unwin, Field Officer in Rural Sociology, Department of Agriculture, Christchurch, describes the making of two unusual, colourful play balls which take but a few hours to make and cost no more than the scraps of felt or material from which they are made and the worn-out woollies with which they are stuffed.

THE instructions given here are for two types of ball, the patchwork ball and the "tennis" ball.

THE PATCHWORK BALL

The ball with the patchwork appearance consists of 12 pentagons fitted together. It is simpler to make of felt than material, as this avoids having many raw edges to turn in. Six bright colours are used, and as each colour touches every other colour, they should be chosen to go well together; no two should clash or be too much alike.

Size of Ball

The ball may be any size, but if it is more than about 6in. across, it is rather heavy for little children to play with. An idea of the size can be got from the pattern piece (Fig. 1). Measure this from the middle of the base to the opposite point. The finished ball will be nearly twice this distance across the diameter. Examples of pattern sizes and ball measurements are as follows:—

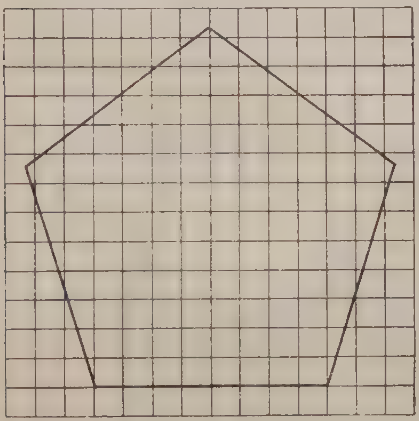
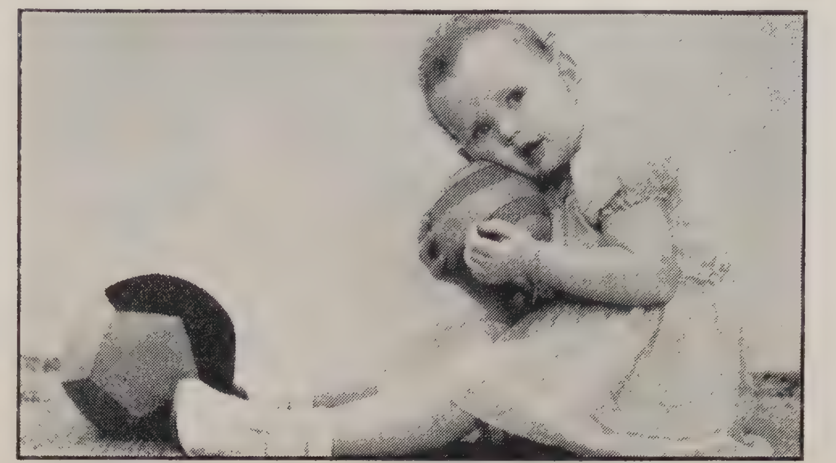


Fig. 1—The pattern piece for the patchwork ball.

Height of pentagon	Approximate diameter of ball
in.	in.
1½	3
2	3¾
3	5½
4	7

The pattern should be copied from the diagram on to squared paper, the size of the squares regulating the size of the pattern produced. If the pattern is copied on to ¼in. squares, a pattern piece just over 3in. high, a very suitable size, is obtained. This will make a ball approximately 5½in. in diameter.



[*Green and Hahn Photography Ltd. photo.*

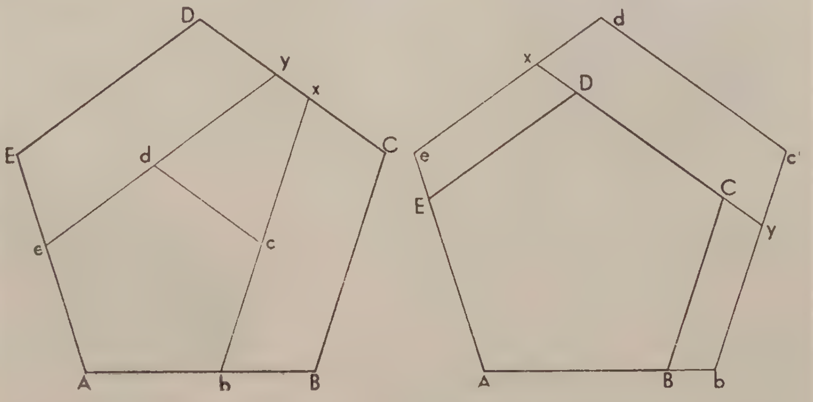
The patchwork ball at the child's feet was made of pentagons considerably bigger than those suggested in this article, and the ball is more than 7in. in diameter, which is too big for toddlers. The child is holding the "tennis" ball described in the article.

To Alter Size of Pentagon

The size of the pattern may also be altered (as shown in Fig. 2) by drawing lines parallel to three of the sides, and if paper with suitably sized squares was not available, this method could be used. Enlarging the pattern this way, however, would be likely to enlarge any error in drawing it also; therefore it would be best to copy the pattern first on to squared paper to make it larger than required, and then to reduce it, rather than to enlarge it direct from the pattern given, unless only a slight increase in size was necessary.

It is important that the pattern used should be exact or the pieces will not fit together properly. All the sides must be the same length and all the angles equal to each other. It is advisable to cut a template in cardboard and use this when cutting out all the pieces of felt.

Fig. 2—Methods of Altering the Size of the Pentagon



To reduce the pentagon—Mark the points b, e, x, and y so that the line Ab = Ae = Dx = Cy. Join bx and ey. Find the points c and d so that bc = ed = Ab = Ae. Join cd, which line should equal the other four sides of the new, smaller pentagon.

To enlarge—Extend AB to b, AE to e, and CD both ways to x and y, so that Bb = Ee = Cy = Dx. Join by and extend to c, and join ex and extend to d, so that bc = ed = Ab = Ae. Join ed, which should equal the other sides. As any error is enlarged, a pair of compasses should be used to make the required distances equal.

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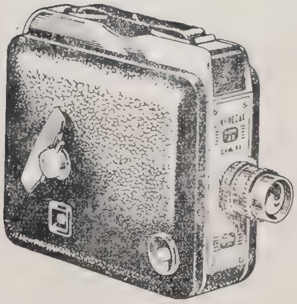

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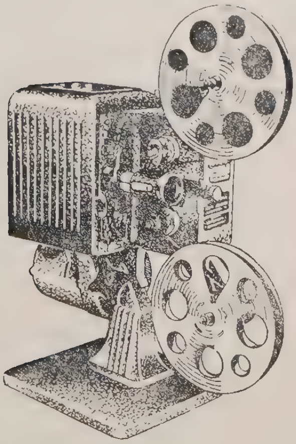

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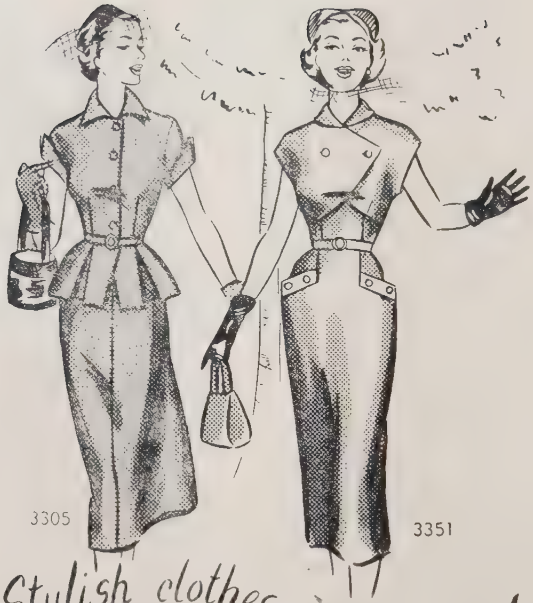

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Arranging of Colours

Cut two pieces of each colour and fit one of each together as shown in Fig. 3A to form the first half of the ball. To make the other half keep No. 1 colour in the same position, but arrange Nos. 2 to 6 round it the opposite way (Fig. 3B). When sewing the two halves together start with No. 2 colour on one half and fit it into the space between Nos. 4 and 5 on the other half. This will bring each pair of the same colour directly opposite each other on the finished ball.

Use a strong, fairly soft thread—crochet cotton or buttonhole twist is better than machine cotton or silk, as these tend to cut the felt—and oversew the edges of the pieces together. Take small, even stitches about ⅛in. apart and not quite ⅛in. deep. At the points where three pieces meet take double stitches across each of the seams for extra strength (Fig. 4). Finish off all the beginnings and ends firmly. Do not use a knot when beginning a thread, as this would pull through the felt too easily. It is better to take a small stitch on the wrong side and catch the end in with the next stitch, and then sew it along in the seam as the work proceeds. Finish off on the wrong side by knotting the thread several times round the stitches showing on the inside of the seam.

Two or three adjacent seams should be left open for stuffing before sewing of the two halves together is completed. If possible, sufficient thread should be left dangling to finish off these seams, as after the ball is stuffed, it is less easy to begin or fasten off an end firmly on the inside without stretching the edge of the felt. After stuffing is completed the opening should be sewn up and the end finished off firmly and inconspicuously. The thread should then be run through the ball for an inch or so, pulled tight, and cut off close. The end will disappear back into the ball.

Stuffing

Old woollies cut into pieces 1 or 2in. square should be used for filling both balls. If they are not cut up, it is impossible to get the stuffing even and the ball will be lumpy. The ball should be stuffed till it is firm but springy and not too hard. Ends of knitting wool make good stuffing, and teased, scoured fleece wool is also excellent. However, worn-out woollies are probably the most universally available. They should not be badly felted, or the wool will have lost its springiness.

THE "TENNIS" BALL

The "tennis" ball is made from two pieces, each the shape of the pieces that go to make up a real tennis ball (Fig. 5). These should be of two bright contrasting colours. To make the ball more attractive a second smaller piece, of a similar shape, may be cut out of each colour and appliqued on to the middle of the piece of the contrasting colour before the two halves are sewn together. In this way an interesting wavy pattern which children will delight in tracing with their fingers is produced on the surface of the ball.

Preparing the Pattern

This ball may be made of felt or a cloth material. If the latter is used,

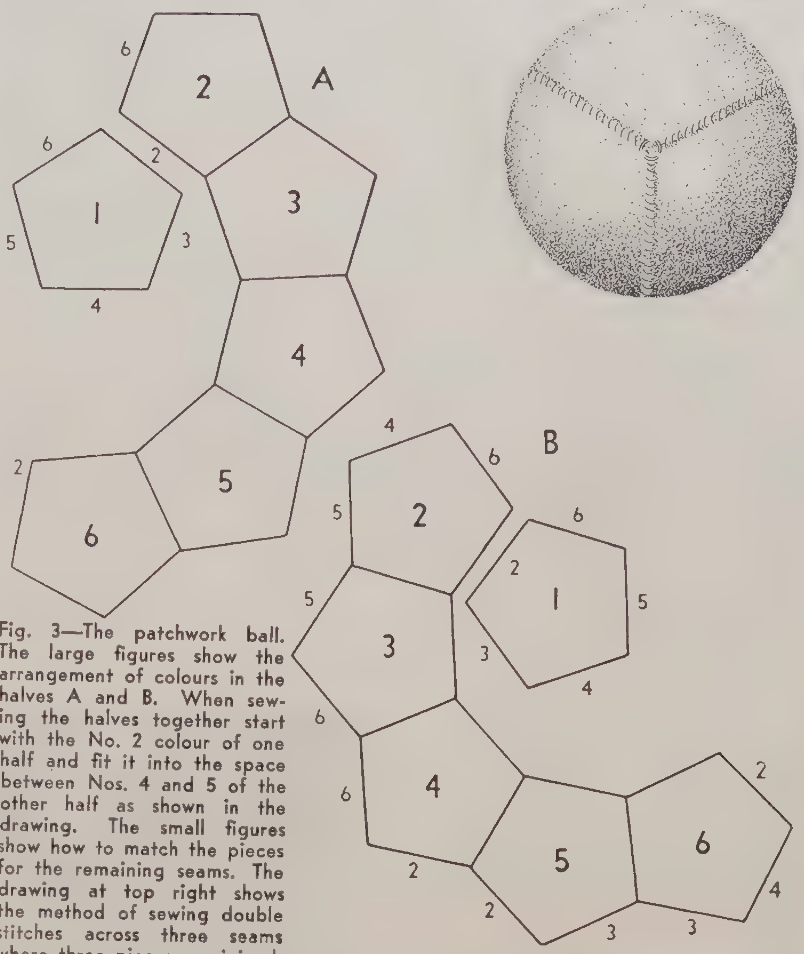


Fig. 3—The patchwork ball. The large figures show the arrangement of colours in the halves A and B. When sewing the halves together start with the No. 2 colour of one half and fit it into the space between Nos. 4 and 5 of the other half as shown in the drawing. The small figures show how to match the pieces for the remaining seams. The drawing at top right shows the method of sewing double stitches across three seams where three pieces are joined.

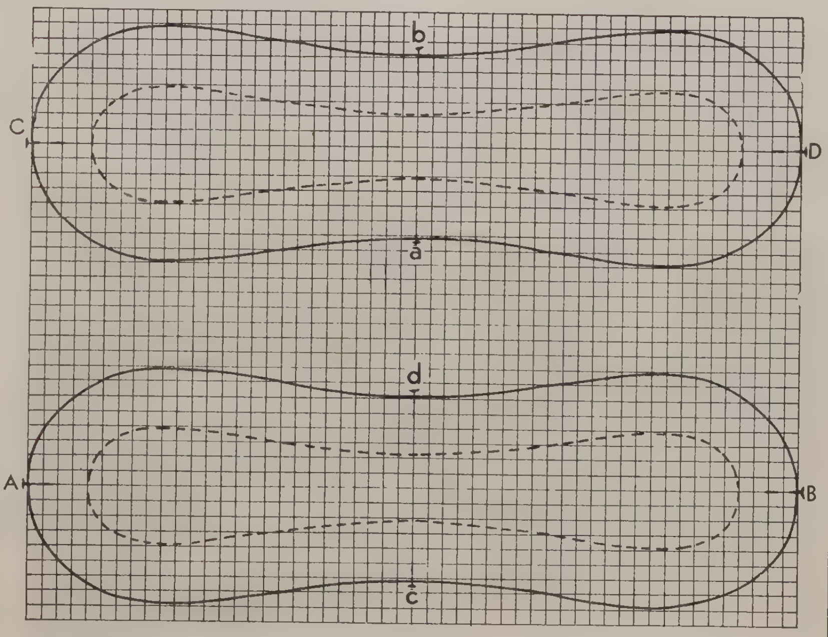


Fig. 4—Pattern pieces for the "tennis" ball, instructions for making which are given on the next page.

460—THE "TENNIS" BALL . . .

closely woven woollen cloth is probably the best, though any strong, firm fabric would do. The length of the pattern should go diagonally across the grain of the material in the large pieces, and preferably in the small pieces too. Enlarge the patterns from the chart on to squared paper, as in the instructions given for the patchwork ball. For this, ¼in. squares are most suitable, as the resulting ball will be nearly 5½in. in diameter. If the pattern is copied on to paper with larger squares, a larger ball will result. For a tennis ball size the pattern pieces should be about 6½in. long. Cut a cardboard template and draw round this directly on to the material. Leave about ½in. outside this line for a hem allowance when cutting out is being done. Cut two pieces, one large and one small, from each of the colours chosen. Turn the hem in on the line all round the four pieces and pin or tack it. The edge will need to be slashed in several places almost to the line on the inward curves along the sides so that it will be flat when turned in. On the two larger pieces machine the hem down close to the edge in matching thread. Pin or tack the small pieces along the middle of the bigger pieces (each on to its opposite colour) and machine them into position, close to the edge of each and in matching colour. Alternatively they may be appliqued down with blanket or feather stitch in a third or a matching colour. If felt is being used, sew the smaller pieces directly to the bigger ones in the same way, either by machine or embroidery. The only difference is that no hem is necessary on the felt, the pieces being cut out on the line.

Sewing the Pieces

When the two main pieces are ready to be sewn together each should be folded in half first lengthwise and then crosswise and the creases at the edges marked with pins (see Fig. 4), that is, in the middle of each end (A, B, C, D), and the middle of each side (a, b, c, d).

Then match the middle of one end of one piece (A) with the middle of one side of the other (a) and pin them in position, wrong sides together. Pin the other end (B) to the middle of the other side (b) and then the end (C) to the side (c) and the end (D) to the side (d), always matching the pins to get the fitting exact. Oversew the edges together with small, neat stitches, using a matching or a contrasting thread. For a cloth ball 24 cotton may be used, but for felt crochet cotton or buttonhole twist is best.

Stuffing

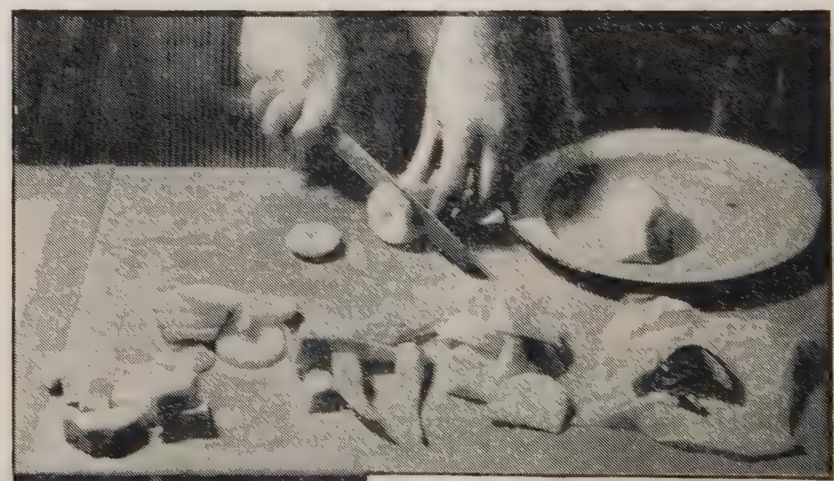
Leave an opening 2 or 3in. long for stuffing. This is best left about halfway between the middle of the end and the middle of the side of both pieces, as stuffing tends to stretch the edges of the opening a little, and in this position both pieces will stretch evenly and so will still match. If the opening is left at the end of one piece, which is the side of the other, the edges are more liable to stretch unevenly.

Stuff the ball firmly but not too hard with small pieces of soft woollen material as already described, then sew up the opening, and the ball is complete. If the ball is being made of felt, follow the instructions given for the patchwork ball for starting and finishing off the thread.

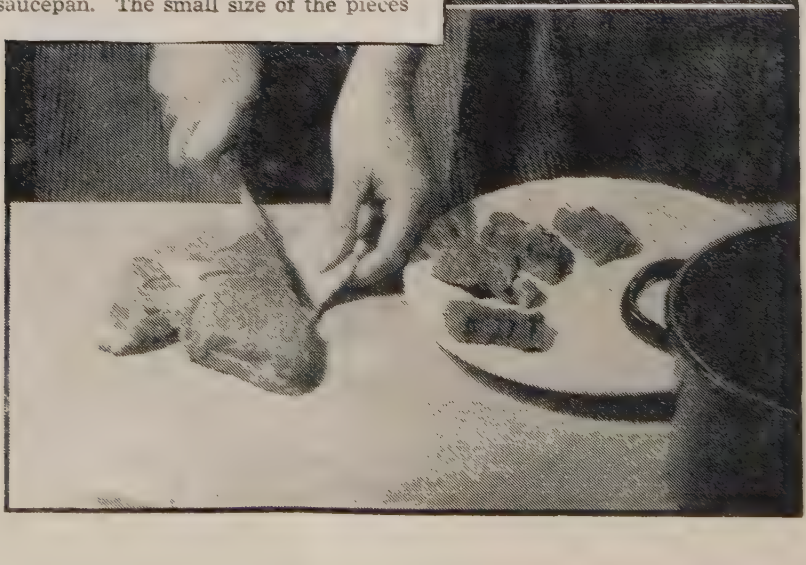
The "tennis" ball is the quicker of the two to make, as it has fewer seams, the hand sewing required for these taking most of the time, but it needs much larger pieces of felt or material, though of only two colours. It could of course be made in four colours, but the effect would be a little different. Both balls are out of the ordinary, gay and attractive, and would make a welcome present for any toddler this Christmas.

STEWING

AN old adage that most New Zealand women learn as their first cooking lesson is the saying "stew boiled is stew spoiled". It is still true because stewing is a long, slow method of cooking the tougher cuts of meat. These are cut into small pieces and cooked in liquid. A stew should be heated gently in a pot with a well-fitting lid or in a casserole in the oven at a low temperature. This article includes suggestions for making every stew a success.



THE first step in making a stew is to wipe the meat thoroughly with a clean, damp cloth and cut off any superfluous fat and stringy parts to prevent greasiness and ensure level cooking. Next cut up the meat with a sharp knife into medium, even-sized pieces and add them to liquid in a saucepan. The small size of the pieces allows the full flavour to escape and blend with the liquid.



Add plenty of vegetables (cut into small pieces like the meat), as they contribute flavour and nourishment, some peppercorns, and sprigs of mixed herbs tied in a small muslin bag. The bag makes it easy to remove the seasoning, which is too acrid to eat, before the stew is served.

Simmer the stew gently for about 2 hours, as such cooking makes the meat tender and juicy; rapid boiling makes it tough and tasteless.

Prepare thickening by mixing flour to a smooth paste with a little cold water and stirring in a little hot liquid from the stew. Add the thickening to the saucepan and stir the stew until it comes to the boil and is thickened. Mixing the flour first with cold water prevents the formation of lumps, but the stew must then be brought to the boil to burst the starch grains of the flour and cause thickening.

Proper Wrapping of Parcels

CHRISTMAS parcels may mean fun and games for the public who send and receive them, but worries and headaches are the lot of postmen who handle parcels that are poorly wrapped, inadequately addressed, or insecurely fastened. In this article Eirene E. Unwin, Field Officer in Rural Sociology, Department of Agriculture, Christchurch, discusses some of the difficulties met by postal authorities in their handling of parcels, and describes the best method of wrapping parcels so that their contents may not be harmed by the unavoidable bumps and weight of other parcels stacked on top of them in transit, and so that they may arrive safely at their destination with the address still legible and the knots still firm.

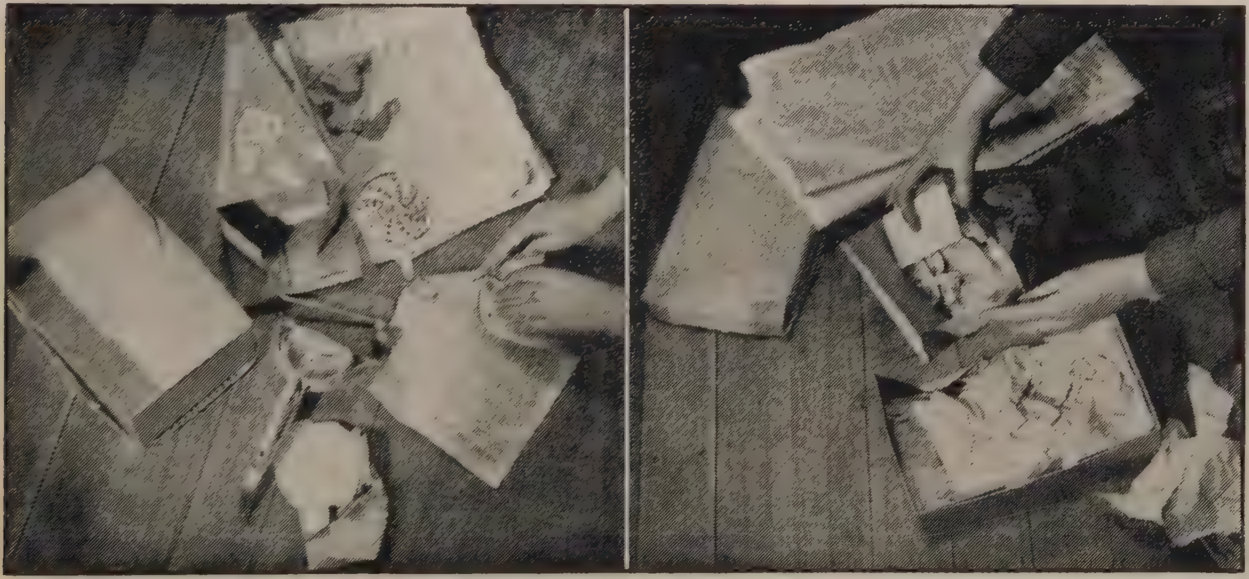
Heavy parcels may receive such a buffeting in transit that unless they are well wrapped and tied they will be torn and the contents damaged.

WHAT gives postmen most cause for concern is finding articles from torn parcels loose in the bottom of the mailbag; often there is little or no chance of finding to whom they were supposed to be going or from whom they came. The fault is not with the men who have handled the mailbags, but with the person who packed the parcel inadequately so that its wrapping did not stand up to the inevitable wear and tear all parcels receive in transit.

Postal Procedure

What happens to parcels after they are posted is probably not realised by many people who pack and send parcels to their friends, or they would give more attention to the way they wrap them.

A parcel is first sorted with the others posted in the same box, and dropped into a bin or bag according to its destination. The parcels for each locality are then sorted again into "direct bags" for the post office from which they will finally be delivered. There are thus two handlings for each parcel even before it leaves the sorting room. Parcels for the same destination go into the same bag, which is then tied and sealed and checked out to a lorry to be taken to the station or ship. On the lorry the bag is stacked with many other bags, and a parcel is as likely to be at the bottom of the pile as at the top. In the train or the ship's hold the bag is stacked with even more bags, and if the journey is rough, a parcel will have other parcels pressing down on it, rolling over it, squeezing their corners into it, or even tearing into it if they have sharp corners; in fact it will be subjected to the very treatment most likely to find all the weak points in its packing. At the end of this journey the bag is unloaded on to a lorry which takes it to a central post office. But unless this is its final destination, it will have other loadings and unloadings, always with other bags stacked with it, and at some time it is sure to be near the bottom, with the



Left—Small articles are wrapped separately in plenty of newspaper. Right—The pieces are packed into their original box and empty corners are stuffed with crumpled paper. As the box has an awkward shape, it will be packed into the shoe box, which is lined and has its corners filled with crumpled paper.

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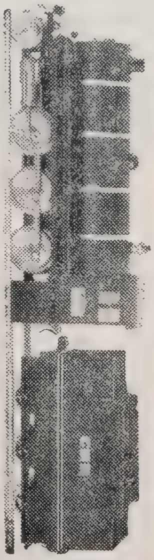

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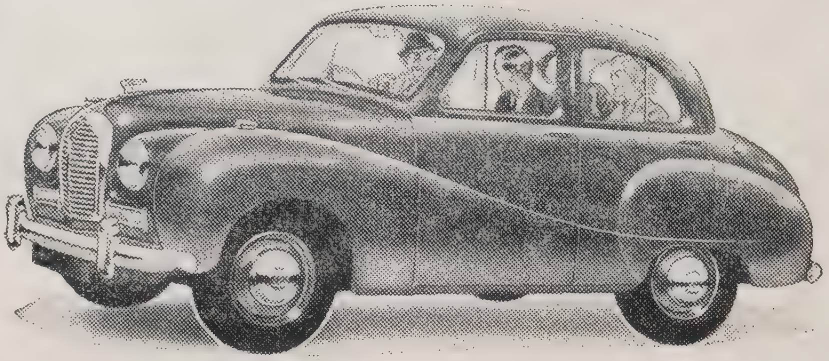

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weight of numerous others crushing down on it. Finally the bag reaches its destined post office and is unsealed and untied, the contents being again sorted for delivery. Only parcels that were firmly wrapped and tied and clearly addressed can be expected to be whole and deliverable at the end of their journey. That so many get through in spite of careless packing is a tribute to the men in the parcels departments of the post offices and to all those who handle the mail bags in transit.

These then are the chief hazards which a parcel must survive. As well as the continual bumps and falls as the bags are transhipped many times from lorry to train or ship and back again, and the jostling by numerous other parcels in the bag, today it usually starts out with a handicap, for most brown paper is not tough enough to come through without being torn to some extent. The greatest hazard of all, however, is the fact that at some time a parcel is sure to have the weight of hundreds of other parcels on top of it, and if it is crushable, it cannot escape being crushed.

The aim then in packing goods for posting is to protect them from being damaged by these hazards—to prevent fragile articles from being broken, to wrap and tie the parcel so that it stays wrapped and tied, and to write the address in more than one place, in case the paper it is written on gets torn.

Some General Rules

The following general rules should be kept in mind when a parcel is being wrapped.

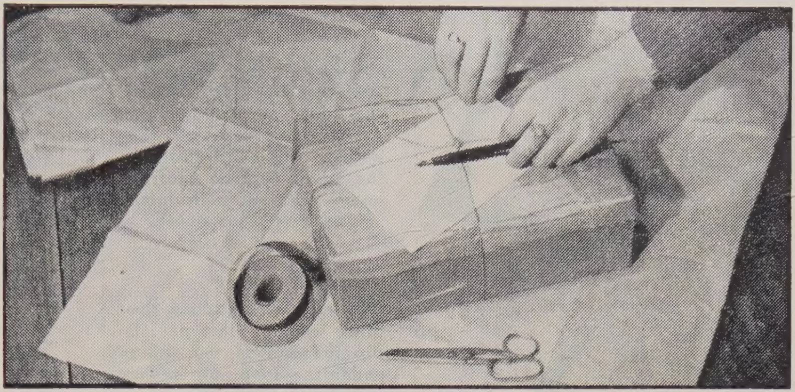
A note should be put in with the contents, giving the name and address of the sender or receiver or both.

Two layers of wrapping paper should be used, the first being tied with string before the second is put on.

Good, stout outer wrapping paper should be used, big enough to cover the parcel well, and single edges should be turned in or stuck down, as folded edges do not tear as easily as single ones. The parcel should be wrapped tightly and smoothly in this paper.

The parcel should be tied tightly with string or twine, or rope if it is big and heavy, and this should be knotted in several places to prevent its coming right off if one part works loose. Gummed paper or transparent cellulose tape should not be relied on to hold a parcel together. Though these may be strong, the strain comes on the paper to which they are stuck, and without string, if the paper tears, the parcel comes to pieces; most wrapping paper tears far too easily for parcels to be fastened without string. A good method of tying a parcel is shown in the diagrams.

The parcel must be addressed clearly, preferably in more than one place, and the sender's name and address should also be shown. If a luggage label is used, the address should be written on the wrapper as well. Stamps also should be put on the wrapper, not on the label, which may be torn off, double postage then being required. Postmarking will not damage the contents, even if they are fragile, as a roller marker and not a stamp is used for postmarking parcels.



When the box has been packed securely the lid is tied on or fixed with strips of gummed paper, which would be suitable at this stage. A note with the sender's name and address should be placed under the string. As the original lid was missing, a lid of corrugated cardboard and gummed paper has been roughly made. The box still has to be wrapped in two layers of paper, each one tied separately.

Special Parcels

Odd-shaped articles should be packed in a box or between two pieces of cardboard, so that the parcel will be a regular shape. If this is not done, and the finished parcel is also an odd shape, there is a great danger that the string will slip during transit, and once it has slipped it can easily come loose.

Soft Goods

Soft goods, especially anything woollen, should be packed in a box. Wool is very elastic and can be squeezed smaller very easily, which leaves the string loose and liable to slip off.

Books

Books might have the corners of the covers broken if they are not wrapped in plenty of thick, soft paper. Probably the best way of protecting them is to fold in the side edges of the wrappers, leaving them a little wider than the book is long, and to pack the book with the ends of the parcel left open. The projecting wrapper protects the corners better than if it is folded tightly round them as in an ordinary parcel. To prevent the tight string from marking the book it is also necessary to have several wrappers, soft and thick, so that the string bites into them instead of into the cover of the book. The outermost wrapper should be as tough as possible and plenty of strong string should be used, especially if there is more than one book in the parcel.

Toys and Glassware

Breakable articles like toys should be packed in strong boxes with plenty of stuffing round them to fill the empty spaces. Crumpled paper and woodwool are both good for this, and if woollies are to go to the same address, they make excellent stuffing.

Glassware or anything very fragile should be packed in a wooden frame or box with plenty of stuffing to act as a shock absorber. This stuffing should not be so tight that it loses its elasticity, for then any jar or knock would be transmitted directly through it to the fragile contents. A little movement within the parcel should be possible, so that jolts and bangs are absorbed and the contents protected from breakage. Incidentally the paying of a "fragile" fee to the Post Office merely ensures that the parcel will be placed in a hamper with other "fragile" parcels instead of in a mailbag, and the postal authorities are in no way responsible if the contents are damaged through inadequate packing.

Mixed Parcels

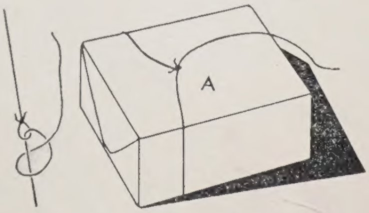
If several things are being packed in one parcel, they are best fitted together as neatly as possible, preferably in a box, with plenty of wrapping for each article. It should not be forgotten that sharp corners are a hazard to other articles in the parcel, and each article should be protected from the rest, as they may all be jammed hard against each other on their travels.

The whole parcel should finally be wrapped very firmly so that nothing is loose or rattling inside.

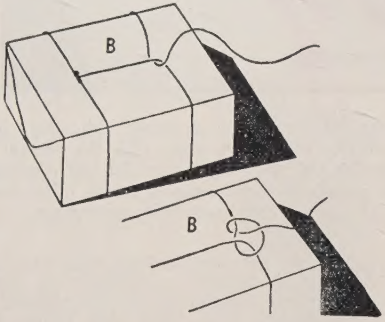
Goods packed in heavy cardboard cartons should be tied with rope or twine and should not be wired or fixed with gummed paper strips only. A blow on the corner of such a carton knocks it sufficiently out of shape to burst the paper or to loosen the wire, which will then very easily slip right off, allowing the carton to come open. Twine and rope are sufficiently elastic to give under the stress, and so do not slip off so easily; also they can be knotted round the carton two ways, which is impossible with wire.

Fruit

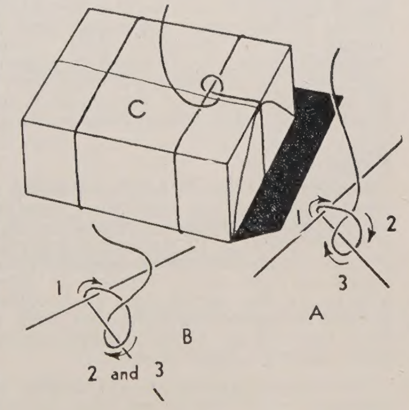
If fruit is sent by post, it should be picked green enough to be in no danger of becoming too ripe before it arrives. If the fruit is to go by ship, the heat in the hold will increase the speed at which it ripens. Peaches or nectarines should be packed in wooden boxes, but soft fruits such as black currants and raspberries must be enclosed in liquid-tight tins with sufficient absorbent material packed around to absorb any juice which may escape. This is important, as it should be



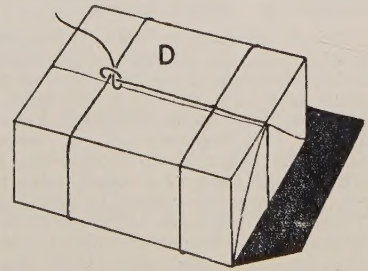
A—Make a loop with a slip knot and pull it tight round one end of the parcel. For extra strength the string may be knotted again with a half hitch round itself (see detail).



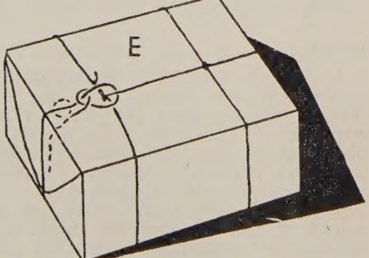
B—Make a loop round the other end of the parcel, slip the end of the string under the loop, or, if the parcel is a heavy one, knot the string with a half hitch. Detail of knot—Pass the end of the string under the original length, pull tight, and hold. Pass the end so that the string goes round and under itself and up through the loop so made. Pull tight.



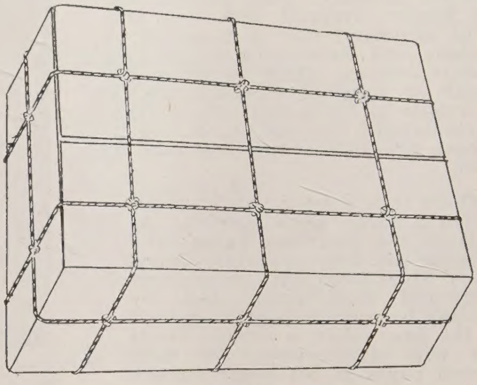
C—Turn the parcel over, bring the string up round the end, and knot it round the first cross-string. Detail of knot—Pass the end under the cross string, back and under itself. Pull tightly backward, then forward, and the knot will hold. For a firmer knot pass the end through the loop just made (see detail). Pull tightly backward, and hold, after 1. Pull tight again forward after 3. It should be noted that A and B are the same knot, but in B the knot can be a half hitch, done with fewer movements.



D—Carry the end forward and knot it round the second cross-string, as shown in C.



E—Turn the parcel over again, pass the end of the string under the first length of string, and finish with several half hitches of the string round itself. Pull each one tight in turn.



Method of tying a large carboard carton (suitable for a 22lb. overseas food parcel) with rope, which should be knotted each time it crosses itself. Light clothes-line would be suitable.

remembered that the sender may be held liable for any damage to other parcels.

Honey

Honey should be sent in soldered tins. Even if honey is solid, it should not be sent in a waxed cardboard carton, especially by ship, as the heat in the hold may melt the wax. All these foods should finally be packed in a hard box to protect them from being crushed.

Miscellaneous Articles

Large, flat paper or thin cardboard articles like greetings cards or photographs, although they travel by letter or packet and not parcel post, should still be protected against creasing and bending during transit. The simplest way to do this is to pack them between two sheets of cardboard big enough to protect all their corners and stiff enough to resist bending. Care should be taken that they do not slip out of the cardboards by tying string round them, or by sticking paper strips over the edges of the cards, thus holding them together. Should a packet like this, which is fairly heavy, be posted in an envelope of which the flap is just tucked in, it is possible that the heavy contents may push the flap out and fall out of the envelope. To prevent this a piece of light string may be tied round the envelope so that it passes over the open end. This still conforms with the postal regulations for "printed matter only". The important thing is to leave the packet open for inspection. It must not be stuck down in any way, so a gummed-paper strip stuck over the open end will not do.

It will be well to remember, when wrapping presents this Christmas, that no parcel goes on its way through the post alone. It is but one among hundreds, and all of these hundreds may at some stage be on top of the one. Therefore the following precautions are essential when parcels are being packed: Protect fragile goods; use plenty of good stout wrapping paper; tie tightly with strong twine and knot securely; write the address legibly, in several places. If this were done with every parcel posted at Christmas, or indeed all the year round, the work of long-suffering postmen would be very much pleasanter.

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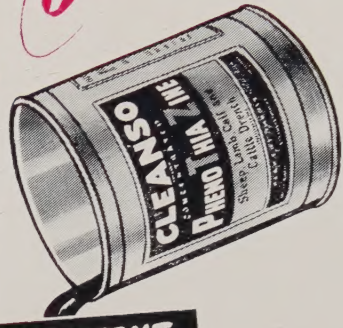

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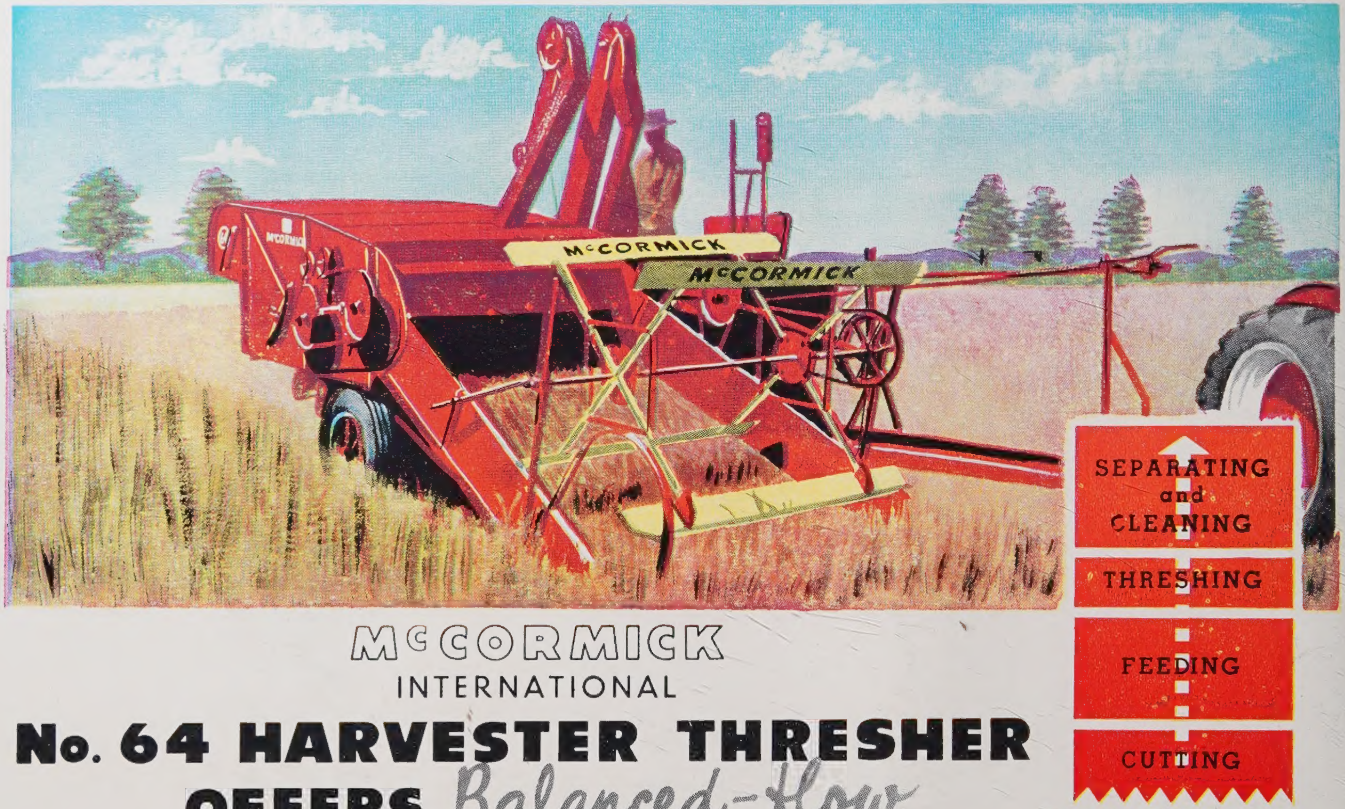

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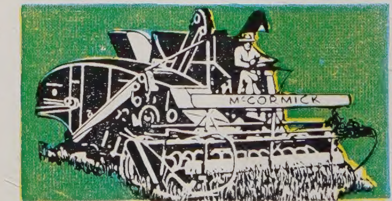

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